SIEMENS

SONOLINE Antares Ultrasound Imaging System
Instructions for Use

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Siemens Medical Solutions USA, Inc.

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SONOLINE Antares Ultrasound Imaging System Instructions for Use

Software Version 2

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CE Declaration

This product is provided with a CE marking in accordance with the regulations stated in Council Directive 93/42/EEC of June 14, 1993 concerning Medical Devices. Siemens Medical Solutions USA, Inc., is certified by notified body 0123 to Annex II.3 – Full Quality System.

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Siemens reserves the right to change system specifications at any time.

About This Manual

The user and reference manuals for this product include the following:

The *Instructions for Use* provides instructions on caring for, maintaining, cleaning, disinfecting, and using the ultrasound imaging system. The *Instructions for Use* also contains information on caring for, cleaning, disinfecting, and storing transducers and their accessories.

The *System Reference* provides information regarding the ultrasound imaging system. It is organized by the following categories: *Image, Calcs, Patient Data,* and *Resources.*

The *Transducer Reference* provides acoustic power intensities and mechanical and thermal index (MI/TI) information for the transducers compatible with the ultrasound imaging system.

Conventions

Conventions used throughout this manual are listed below. Take a moment to familiarize yourself with these conventions.

Warnings, Cautions, and Notes

⚠ **WARNING:** Warnings are intended to alert you to the importance of following the correct operating procedures where risk of injury to the patient or system user exists.

⚠ **Caution:** Cautions are intended to alert you to the importance of following correct operating procedures to prevent the risk of damage to the system.

Note: Notes contain information concerning the proper use of the system and/or correct execution of a procedure.

Control Panel Keys and Controls

Controls and keys located on the control panel are identified by uppercase boldface type.

Example: Rotate the **MENU** control.

Keys located on the keyboard are identified by boldface type.

Example: Press the **Patient** key located on the keyboard.

On-Screen Objects

On-screen objects such as task card tabs, menu selections, buttons, entry fields, names of forms and dialogs, and group boxes are identified by boldface type.

Example: The system displays the **Image** task card.

Selection of On-Screen Objects

The **SELECT** key on the control panel functions as a point-and-select device when used with the trackball (similar to a computer mouse). To select an on-screen object (such as a task card tab or a button), roll the trackball to position the pointer (cursor) on the object and then press the **SELECT** key on the control panel.

Special Terms

Special terms are indicated in boldface italicized text and are accompanied by a brief description on their first use in the manual.

Example: When the trackball is used to make menu selections, it is assigned to the ***pointer*** function.

Cross References

When additional information exists within this or other manuals, a reference graphic and the name of the book is provided in the right column. If the information exists within the chapter, a cross-reference to the page number is listed. Otherwise, information is referenced by topic and chapter number. The *System Reference* organizes information by category, topic, and chapter number.

In the **System Reference** example, Image and Resources are categories; Imaging and Accessories and Options are topics; Ch 1 and Ch 2 are chapter numbers.

Transducer Reference

Acoustic Tables	Ch 1

Instructions for Use

System Controls	Ch 3

System Reference

IMAGE:	
Imaging	Ch 1
RESOURCES:	
Accessories and Options	Ch 2

System Presets

You can use the options and settings available in the system presets menu to set up the ultrasound system with your preferences. Presets define the configuration of the system software whenever you power on the system.

You can press the **Presets** key on the keyboard or select the **Presets** button on the image screen to access the system **Presets** menu.

A complete listing of system presets is located in the *System Reference*. Whenever a system preset is discussed in other chapters or in the User and Reference Manuals, a graphic is provided in the right column.

The graphic identifies a preset option or setting in the system presets menu that is available for you to customize your ultrasound system. The name of the category on the menu containing the system preset is listed for your convenience.

Example: Use the system presets to set the number of heart cycles to include between the two vertical lines.

System-wide Meas. Tools

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Instructions for Use

Chapter Title	Chapter Description
Chapter 1 **Introduction**	General overview of the diagnostic ultrasound imaging system, including system options, features, and design.
Chapter 2 **Safety and Care**	Detailed information on system safety and how to care for and maintain the system, transducers, and transducer accessories.
Chapter 3 **System Controls**	Explanation of all controls and keys on the control panel (including the alphanumeric keyboard) and on-screen objects.
Chapter 4 **System Set Up**	Detailed descriptions of how to transport, set up, and prepare the system for use, including transducer connection and system startup procedures.
Chapter 5 **Beginning an Exam**	Information on starting an examination, including instructions for entering and editing patient data and selecting an exam type, imaging mode, and transducer.
Chapter 6 **Technical Description**	Technical description of the ultrasound system.

Note: Not all features and options described in this publication are available to all users. Please check with your Siemens representative to determine the current availability of features and options.

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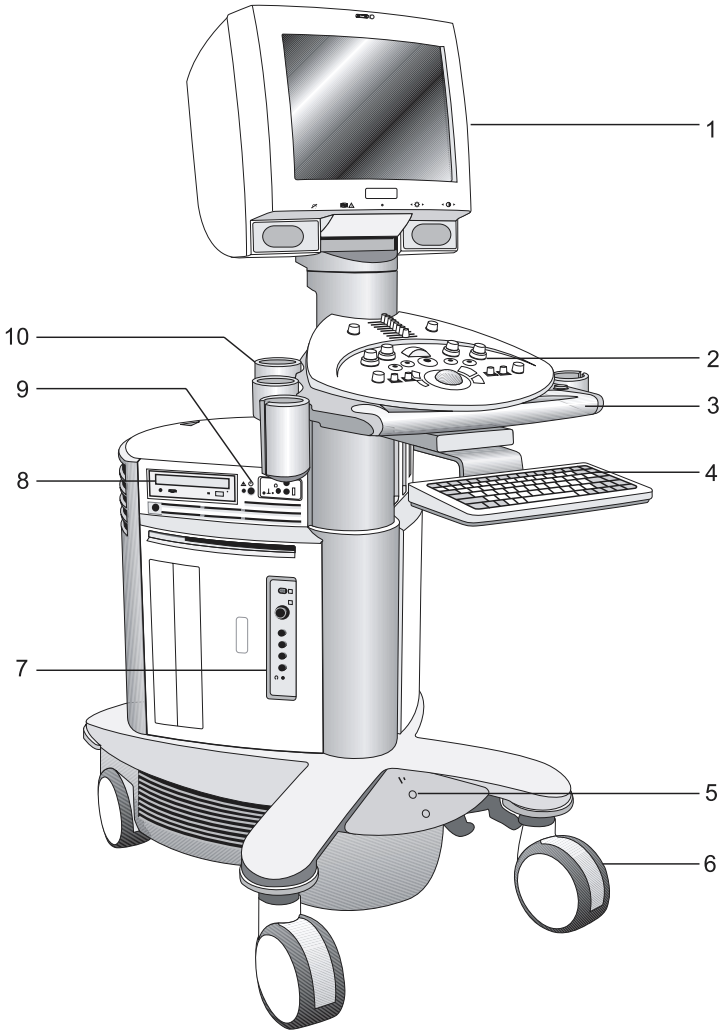
System Overview

The SONOLINE Antares system is a high-resolution, digital, broadband diagnostic ultrasound imaging system. In addition to 2D-mode and M-mode imaging, the system is integrated with pulsed Doppler, Color Doppler, and Power Doppler imaging.

The system utilizes broadband, multi-frequency transducer technology and state-of-the-art image processing techniques.



Left-front view of the SONOLINE Antares ultrasound system.

1 User-adjustable monitor with two forward-facing speakers
2 User-adjustable control panel
3 Front handle
4 Language-specific alphanumeric keyboard
5 Central brakes
6 Front swivel wheels
7 Physio panel
8 Recordable compact disk (CD-R) drive
9 Power ON/OFF ⏻ (Standby)
10 Transducer holders

Configurations

The SONOLINE Antares system with the StellarPlus™ performance package software is available in 100V~, 115V~, and 230V~ main voltages in the following configurations:

Supports curved array, linear array, phased (sector) array and endocavity transducers, Multi-D™ and Hanafy Lens transducer technologies, Ensemble™ Tissue Harmonic Imaging (THI), recordable compact disk drive (CD-R), high-density hard disk, biopsy capabilities, and DICOM software. Also supports system options.

Instructions for Use

System/Hardware Options 1-5

Language Formats

Operating system software, operating instructions, and control panel overlays are available in English, German, French, Spanish, and Italian languages.

Transducers

Wideband MultiHertz™ multiple frequency transducer technology supports imaging frequencies from 2.0 MHz to 13 MHz. Multiple frequency capability is available for all transducers in 2D, M, Color, Power, and Doppler modes. You can connect up to three array transducers to the imaging system, with one transducer being the active transducer.

Software/Hardware Options

- Universal Modem
- ECG, USA version
- ECG, European version
- Footswitch
- SieScape™ Panoramic Imaging software
- Color SieScape™ Panoramic Imaging option (requires SieScape™ Panoramic Imaging software)
- SieClear™ Multi-View Spatial Compounding option
- 3-Scape™ Real-Time 3D Imaging option
- TEQ™ technology option
- Cadence™ Contrast Agent Imaging option

Intended Use

⚠ **Caution:** In the United States of America, federal law restricts this device to sale or use by, or on the order of, a physician.

The SONOLINE Antares ultrasound system supports the following applications:

- Abdominal
  (Renal)
- Obstetrics
  (Fetal Echo)
- Gynecology
- Small Parts
  (Breast, Testicle, Thyroid)
- Musculoskeletal/Superficial Musculoskeletal
- Pediatric
  (Abdomen, Infant Hip, and Neonatal Cephalic)
- Vascular
  (Arterial and Venous)
- Digital
- Urology
  (Penile, Pelvis, Prostate)

Transducer Reference

Listing of Transducers and Intended Application Ch 1

Operating Modes

- **2D-mode:** 2D-mode is the default setting. When the system is powered on, the image screen displays in 2D-mode.
- **M-mode:** Full screen M-mode display and 2D/M-mode display are available.
- **Pulsed Doppler:** Pulsed Doppler can display a spectrum simultaneously with a 2D image. An update function is available to toggle a frozen 2D image with a real-time spectrum, or a real-time 2D image with a frozen spectrum.
- **Color Doppler:** Color Doppler displays in a 2D-mode image and in 2D/Doppler display.
- **Power Doppler:** Power Doppler displays in a 2D-mode image and 2D/Doppler display.

Image Screen Layout

The monitor on the ultrasound system displays clinical images together with important operating parameters, patient data, and control commands. The primary tasks during an exam are grouped into task cards that follow the high-level workflow of an exam. The available task cards are **Image**, **Calcs**, **Review**, and **Compose**. Images are acquired and optimized in the **Image** task card, measurements are made in the **Calcs** task card, data is reviewed in the **Review** task card, and any post-processing functions are done in the **Compose** task card.

Many fields or areas of data displayed on the screen are multi-functional. The image field can display a 2D-mode image, M-mode sweep, Doppler spectrum, and their combinations, calipers, pictograms and annotation text, biopsy guidelines, and CINE icons. An image can be inverted on a vertical axis and reversed on a horizontal axis to facilitate viewing and measurements.

EMC Note: Operating the ultrasound imaging system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

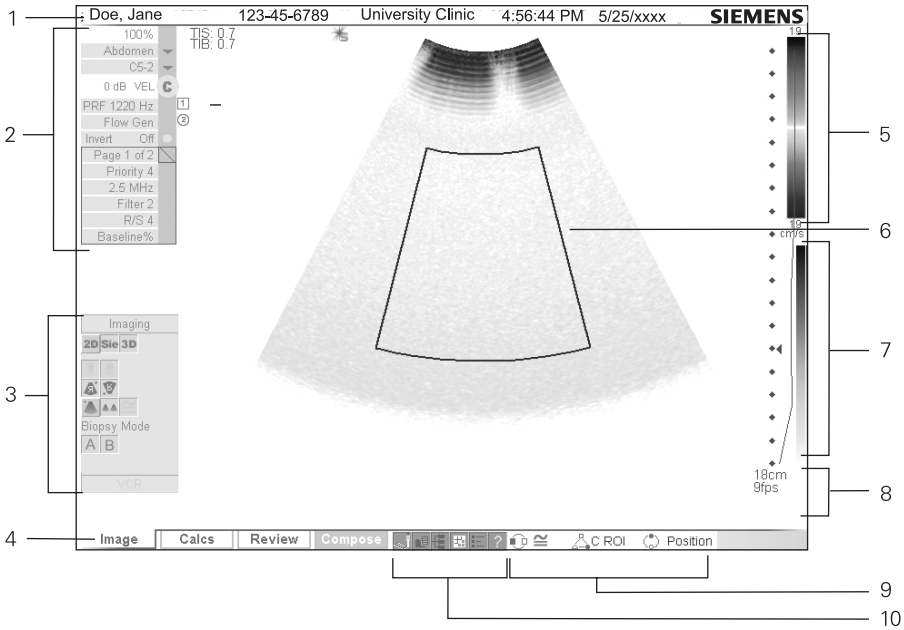
Screen Saver

Basic System

The screen saver feature automatically freezes the system and replaces the active display with a screen-saver display after the system has been inactive for a specified number of minutes. Use system presets to designate this period of time. Exit the active screen saver display by pressing any key, adjusting any control, or rolling the trackball.

Note: The screen saver feature is not available when the system is in VCR playback or Biopsy.

Sample Image Screen



1 **Patient banner**. Information for identifying the patient, operator, institution, date, and time.

2 **Parameter menu**. Displays image optimization parameters for each operating mode.

3 **Group box**. Displays groups of controls that allow the user to modify screen formats and controls for system features and options.

4 **Task card**. The available task cards are **Image**, **Calcs**, **Review**, and **Compose**. Images are acquired and optimized in the **Image** task card. Measurements are made in the **Calcs** task card. Data is reviewed in the **Review** task card, and any post-processing functions are performed in the **Compose** task card.

5 **Color bar** and display.

6 Color Doppler **region of interest** (**ROI**).

7 **Gray bar** and **gray map**.

8 **Image status**. Displays Depth in centimeters, a Zoom (Z) indicator, frames per second (fps), and CINE frame counter.

9 **Trackball status**.

10 **Shortcut buttons**. Accesses the Patient Registration, Report, Patient Browser, Film Sheet, system presets, and the online **Help**. They are an alternative to the function keys on the keyboard.

Documentation Devices

⚠ **Caution:** Peripheral devices specified for use with the ultrasound system are listed in the *System Reference*. Any use of other devices with the system is at the user's risk.

System Reference

PATIENT DATA:
CD drive Ch 2
RESOURCES:
Accessories and Options Ch 2

The system supports a maximum of three documentation devices connected to the system in the following configurations:

- Up to three documentation devices, all off-board
- Up to two documentation devices on-board, with one device off-board
- Any single documentation device on-board, with up to two devices off-board

Check with your sales representative when ordering a peripheral device to ensure you are ordering a valid combination. The following devices are available:

- Black and white printer, (3" x 4" [A6] format).
- Color printer (5" x 7" [A5] or 3" x 4" [A6] format).
- Videocassette recorder (VCR) with either NTSC or PAL format.

Note: Some documentation devices may be controlled using the system control panel, others may need to be operated remotely.

Note: Refer to the manufacturer's instructions for specific information concerning the operation of these devices.

⚠ **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult Siemens service department or your local Siemens representative.

Patient Data Management

Patient data consists of saved or printed ultrasound images and printed patient reports.

Patient data is saved to the ultrasound system internal hard disk (local database). Patient data may be copied to the integrated compact disk drive (CD-R drive) or to a network database if the ultrasound system is configured to support networked communication, and is connected to a network.

Patient data that is printed is also automatically saved to the ultrasound system internal hard disk (local database).

Measurements and Reports

The measurement function contains measurement labels, measurement tools, pictograms, and reports for all of its intended uses.

System Reference

CALCS:
Measurements
and Reports Ch 1
IMAGE:
Imaging Functions Ch 1

System Presets

You can customize many features of the ultrasound system by using the Presets menu to designate default settings. The values are stored in non-volatile memory and will remain intact when the system is powered off.

Each user of the system can determine settings for imaging preferences and default settings, then store them on a disk. Those user-defined settings can then be loaded along with new system software. The disk also serves as a backup.

User-Defined Exam Type

The ***user-defined exam type*** feature allows you to capture an optimized configuration of imaging parameter settings for a specific transducer and exam.

2 Safety and Care

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Operating Safety and Environment

Do not operate the ultrasound imaging system until you fully understand the safety considerations and procedures presented in this manual.

System Symbols

The table below is provided for your identification of important symbols located on the ultrasound imaging system and transducers:

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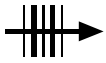
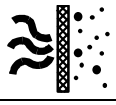
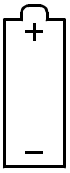
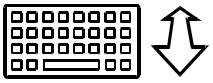
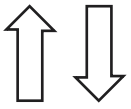
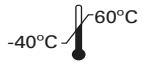
System Controls Ch 3

Symbol	Explanation
	Danger: Risk of explosion if used in the presence of flammable anesthetics.
	Caution: Risk of electric shock.
	Do not open. Refer servicing to qualified service personnel.
	Consult Operator's Manual
	Standby – ON
	ON only for MAINS control
	OFF only for MAINS control
	Microphone Connection
	Headphone Connection
	Degauss Switch

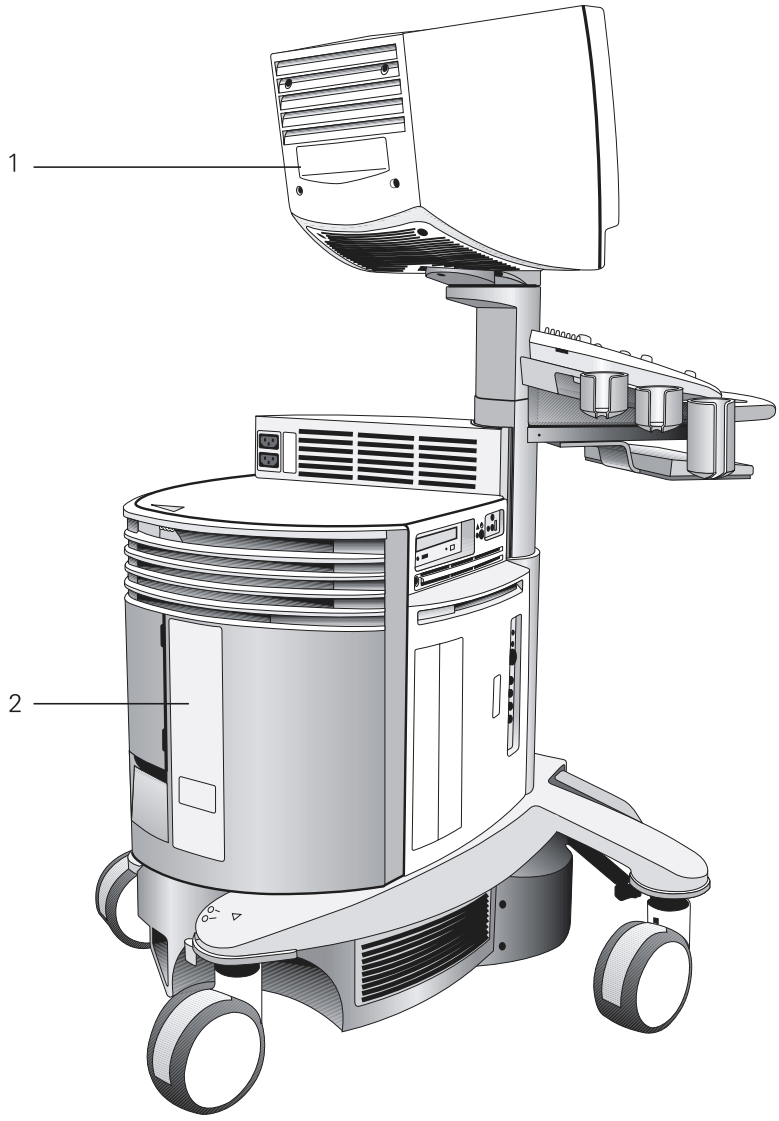
Symbol	Explanation
	Monitor self test
	Brightness Control
	Contrast Control
	USB Connection
	Ethernet 10/100BaseT Connection
	Audio
	Video Luma/Color
	Composite Video
	Video – Red, Green, Blue
	Control Panel Light or Indicator Light
	Yellow Indicator Light
	Status Indicator for DC Power Good (Green) or Green Indicator Light
	Printer Connection
	Type BF Defibrillator-proof Patient Connection

Symbol	Explanation
	Type BF Applied Part
	Type B Patient Connection
	Continuous Wave Transducer Port
	Transducer Port
	ECG Signal Connection
ECG	Electrocardiogram (EKG)
	Signal Input
	Signal Output
	PS2 Port/Bar Code Scanner
	Footswitch Connector
	Equipotential Connection
	Protective Earth Ground
	Do not install wet
	Location of Air Filter
	Insert this way

Symbol	Explanation
	Battery
	Recycle Ni-MH battery
	Do not dispose of by burning
	Do not dispose of by dumping in garbage
	Do not dispose of by flushing down lavatory
	Keyboard Movement Indicator
	Keyboard Weight Restriction
	Shelf Weight Restriction
	Brake Engaged
	Brake Released
	Direction/Steer Lock
	Manufacturer's declaration of product compliance with applicable EEC directive(s) and the European notified body.
	DEMKO-Denmark approval mark.
	UL symbol for listing as recognized components for Canada and United States of America

Symbol	Explanation
	UL classified symbol for Canada and United States of America
	Transducer storage temperature range
	Transducer unlock (left) and lock (right) positions
IPX8	Protected against the effects of continuous immersion in water
	Bar Code
V~	AC (alternating current) voltage source
	Identifies voltage, frequency, and current rating of system configuration for MAINS. 100V~, 50/60 Hz, 15A maximum draw, 15A MAINS breaker
	Identifies voltage, frequency, and current rating of system configuration for MAINS. 115V~, 50/60 Hz, 12A maximum draw, 15A MAINS breaker
	Identifies voltage, frequency, and current rating of system configuration for MAINS. 230V~, 50/60 Hz, 6.5A maximum draw, 7.5A MAINS breaker
	Indicates this side up
	Do not stack
	Shipping weight (example)
	Do not allow to get wet
	Fragile. Handle with care.

Labels



1 X-ray shielding notice
2 System warning label, identification label, and certification labels

SONOLINE Antares ultrasound imaging system label locations.

Danger: Risk of explosion if used in the presence of flammable anesthetics.

Achtung: Explosionsgefahr bei Verwendung in Gegenwart entzündlicher Anästhetika.

Danger : Risque d'explosion. Ne pas employer en presence d'anesthesiques inflammables.

Peligro: Riesgo de explosión. No emplear en presencia de anestésicos inflamables.

Pericolo: Rischio di esplosione. Non usare in presenza di anestetici infiammabili.

Caution: Risk of electric shock. Do not open. Refer servicing to qualified service personnel.

Vorsicht: Stromschlaggefahr. Gerät nicht öffnen. Servicearbeiten qualifiziertem Personal überlassen.

Attention : Risque de choc electrique. Ne pas ouvrir. Faire appel au personnel qualifie.

Precaución: Riesgo de sacudida eléctrica. No abrir. Acudir al personal del Servicio Técnico.

Attenzione: Pericolo di scossa elettrica. Non aprire. Rivolgersi a personale qualificato.

Note: See operating instructions.

Hinweis: Gebrauchsanweisung beachten.

Remarque : Se reporter au Mode d'emploi.

Nota: Ver instrucciones de uso.

Nota: Consultare il manuale dell'utente.

Caution: Federal (U.S.) law restricts this device to sale by or on the order of a physician.

Manufactured in the U.S.A. by
Siemens Medical Solutions USA, Inc.
Issaquah, WA 98029-7298 U.S.A.

Distributed by:
Siemens Medical Solutions USA, Inc. Issaquah, WA 98029-7298 U.S.A. / Siemens AG, Erlangen, Germany

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Diagnostic Ultrasound System

Manufacture Date

Product Status Number

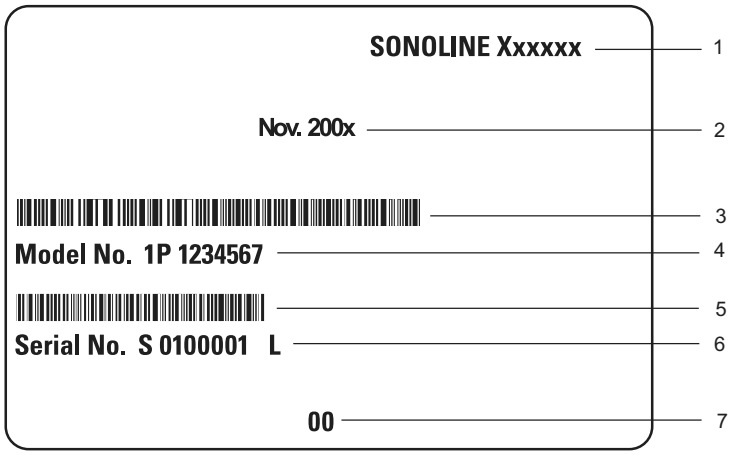
Upgrade

A B C D E F G H J K L M N P R S T V W

CLASSIFIED C UL US
MEDICAL ELECTRICAL EQUIPMENT WITH RESPECT TO ELECTRIC SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL2601-1/CAN/CSA C22.2 NO.601.1 76ZJ

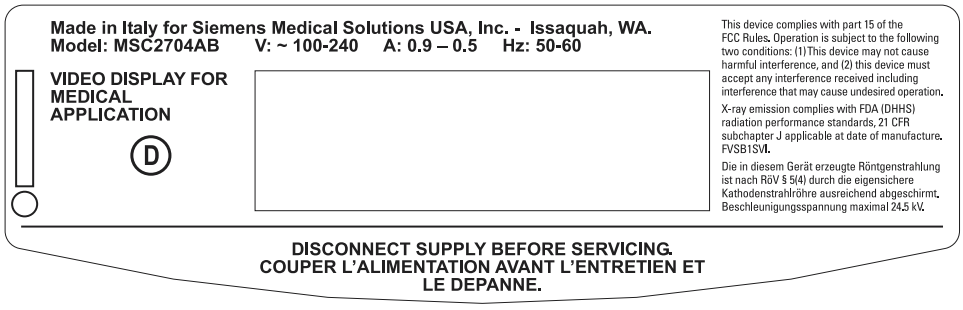
CE 0123

Example of system warning label, identification label, and certification labels.



1 Product name
2 Manufacturing date
3 Model number barcode
4 Model number
5 Serial number barcode
6 Serial number
7 Product status number

Example of system serial number (overlays system warning label).


Made in Italy for Siemens Medical Solutions USA, Inc. - Issaquah, WA.
Model: MSC2704AB V: ~ 100-240 A: 0.9 – 0.5 Hz: 50-60
VIDEO DISPLAY FOR MEDICAL APPLICATION
D
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.
X-ray emission complies with FDA (DHHS) radiation performance standards, 21 CFR subchapter J applicable at date of manufacture. FVSB1SVI.
Die in diesem Gerät erzeugte Röntgenstrahlung ist nach RöV § 5(4) durch die eigensichere Kathodenstrahlröhre ausreichend abgeschirmt. Beschleunigungsspannung maximal 24.5 kV.
DISCONNECT SUPPLY BEFORE SERVICING.
COUPER L'ALIMENTATION AVANT L'ENTRETIEN ET LE DEPANNE.

Example of X-ray shielding notice: "The X-ray radiation of this unit is sufficiently shielded."

Biohazard Considerations

⚠ **WARNING:** This equipment is not suitable for intracardiac use or direct cardiac contact.

⚠ **WARNING:** For neonatal head imaging, Siemens recommends that you exercise special care during neonatal cephalic scanning to avoid possible damage to the posterior region of the eye. The ultrasound energy emitted by the transducer easily penetrates the fontanels of the infant.

⚠ **WARNING:** Siemens makes every effort to manufacture safe and effective transducers. You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. These precautions should be considered in the use of any application that may indicate the need for such care, and during endocavity or intraoperative scanning; during biopsy or puncture procedures; or when scanning patients with open wounds.

⚠ **WARNING:** Transducer Covers: There have been reports of severe allergic reactions to medical devices containing latex (natural rubber). Health care professionals are advised to identify latex-sensitive patients and to be prepared to treat allergic reactions promptly. For additional information in the U.S.A., refer to FDA Medical Alert MDA91-1.

⚠ **WARNING:** Ultrasound energy is transmitted more effectively through water than through tissue. When using a standoff device of any kind, for example, a waterpath or gel pad, the actual mechanical and thermal indices, MI and/or TI, may be higher than indicated in the output display on the ultrasound system.

The assessment of the biological effects of diagnostic ultrasound on humans is a subject of ongoing scientific research. This ultrasound system, and all diagnostic ultrasound procedures, should be used for valid reasons, for the shortest possible period of time, and at the lowest mechanical and thermal indices necessary to produce clinically acceptable images.

Transducer Reference

Acoustic Output Ch 3

According to the principles of ALARA (As Low As Reasonably Achievable), the acoustic output should be the ***lowest level required to satisfactorily perform the examination***.

The SONOLINE Antares ultrasound imaging system complies with the standards of the American Institute of Ultrasound in Medicine (AIUM) and the National Electrical Manufacturer's Association (NEMA), the guidelines of the United States Food and Drug Administration (FDA) and the standards of the International Electrotechnical Commission (IEC) in terms of safety and acoustic output levels. The ultrasound output levels are stated to permit the user to critically evaluate the ultrasound system settings in the event of new research findings being announced.

Acoustic Output ▪ Mechanical and Thermal Indices

⚠ **WARNING:** Ultrasound procedures should be used for valid reasons, for the shortest period of time, and at the lowest mechanical/thermal index setting necessary to produce clinically acceptable images.

The ultrasound system incorporates an output display of Mechanical and Thermal Indices to allow you to monitor, and to limit, the amount of ultrasound energy that is transferred to the patient.

Note: For ultrasound systems distributed in the United States of America, refer to the Medical Ultrasound Safety ultrasound education program brochure produced by the AIUM that is included in the *Transducer Reference*.

Transducer Reference

Acoustic Output Ch 3

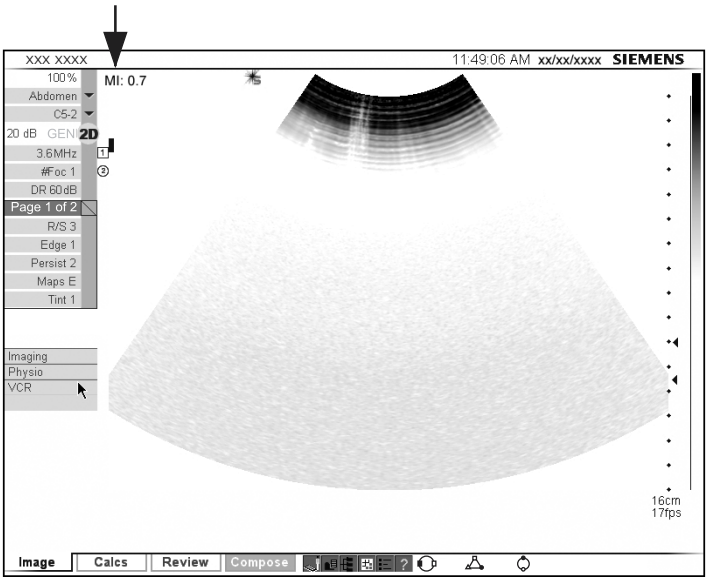
Instructions for Use

Changing the Transmit Power 2-14
Transmit Power Display 2-15

Mechanical and Thermal Indices

The ultrasound system displays the Mechanical and Thermal Indices during real-time imaging, in all imaging modes, when the Mechanical Index or the Thermal Indices are equal to or exceed a value of 0.4.

Note: During exams using Cadence™ Contrast Agent Imaging (CCAI), the system always displays values for the Mechanical Index (MI) and the Maximum of Mechanical Indices measured at the active focal zones (MIF).



Location of mechanical and thermal indices on the image screen.

Indices display in the abbreviated form shown below:

- **MI:** Mechanical Index
- **MIF:** Maximum of the Mechanical Indices measured at the active focal zones (displayed during CCAI exams only)
- **TIB:** Bone Thermal Index (fetal application)
- **TIS:** Soft Tissue Thermal Index
- **TIC:** Cranial Thermal Index

Transmit Power Control

Adjust the transmit power and the corresponding acoustic pressure delivered through the transducer to the patient by using the designated control on the ultrasound system. It is the main system function that determines the transmitted intensity of ultrasound for all transducers and imaging modes during real-time imaging, though it is not the only function that affects the mechanical and thermal indices. The range and especially the maximum level of the mechanical and thermal indices differs depending on the transducers. In addition, each diagnostic exam type has preset values for mechanical and thermal indices.

Note: Maximum transmit acoustic intensity and the mechanical index for each exam type is limited in accordance with the United States Food and Drug Administration's (FDA) recommendations and guidelines. System default transmit intensity and mechanical index values are always below the FDA recommendations for each exam type. Although some exam types may default to a condition of maximum allowable transmit power, there are other system controls or functions that could raise acoustic output levels.

Instructions for Use

Functions Affecting Acoustic Output 2-16

System Reference

RESOURCES: System Presets Ch 1

To increase the transmit power:

- To increase the transmit power, rotate the **TRANSMIT POWER** control clockwise.

To decrease the transmit power:

- To decrease the transmit power, rotate the **TRANSMIT POWER** control counterclockwise.

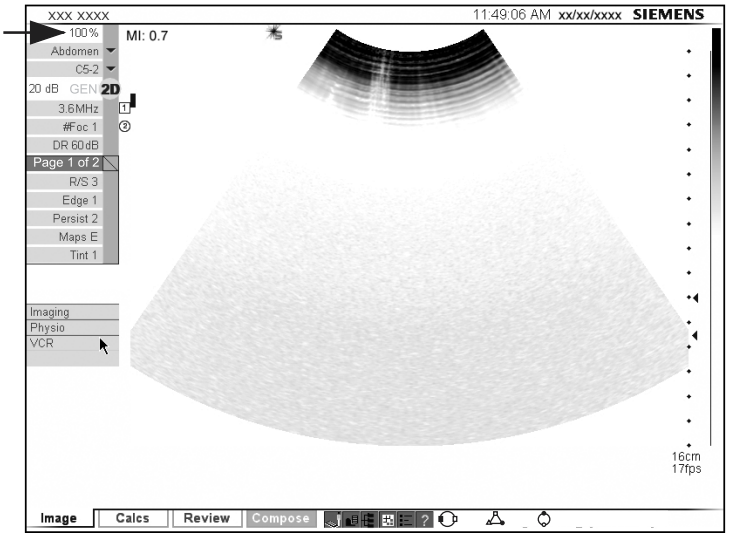
Transmit Power Display

The transmit power range is from 0% to 100%. Selecting 100%, in combination with other ultrasound system controls or functions, generates the maximum acoustic intensity and mechanical index for each transducer, where:

System Reference

RESOURCES:
System Presets Ch 1

$I_{SPTA.3}$: ≤ 720 mW/cm^2 **and** MI ≤ 1.9



Location of transmit power display on the image screen.

Imaging Functions that Change Acoustic Output

⚠ **WARNING:** Observe the real-time display of mechanical and thermal indices (MI/TI) at all times.

In addition to the adjustment of the transmit power, adjustment of the following imaging functions and/or controls may affect the acoustic output:

- Automatic Time-out
- Color Ensemble Size
- Color ROI Position
- Color ROI Size
- Doppler gate position
- Doppler Color PRF
- Doppler Gate Size
- Exam Type
- Field of View (Scan Angle)
- Focus
- Frame Rate
- Freeze
- Image Depth
- Imaging Mode
- Line Density/Resolution
- M-mode ROI Position
- Multi-Frequency
- Power On/Off ⏻
- Presets
- Reset
- Transducer
- Transmit power
- Update
- Gel Pad
- Zoom

Transducer Surface Temperature Limits

The following table provides the maximum surface temperature of the transducers compatible with the system.

Transducer	Maximum Temperature
C5-2	≤ 41° C
CX5-2	≤ 41° C
CH6-2	≤ 41° C
VF7-3	≤ 41° C
VFX9-4	≤ 41.6° C
VF10-5	≤ 41° C
VF13-5	≤ 41° C
VFX13-5	≤ 41° C
P10-4	≤ 41° C
PH4-1	≤ 41° C
EC9-4	≤ 41° C

Electrical Safety

⚠ **WARNING:** For 115V ultrasound systems: To ensure grounding reliability, only connect the system to a hospital-grade power outlet.

⚠ **WARNING:** The AC power connector plug for the ultrasound system is a three-prong grounded plug (in the U.S.A.) and should never be adapted to any two-prong (non-grounded) outlet, either by modifying the plug or by using an adapter. In the U.S.A., proper grounding requires the AC power connector plug to be plugged into a hospital-grade power outlet.

⚠ **WARNING:** To avoid electrical shock, never modify the ultrasound system AC power connector plug, as doing so may overload your facility's power circuits. To ensure grounding reliability, connect the system only to an equivalent outlet.

⚠ **WARNING:** To avoid electrical shock, never use equipment that shows signs of wear or tampering, or that has a ground plug which has been bypassed by using an adapter.

⚠ **WARNING:** Equipment connected to the ultrasound system and in the patient zone must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can result in chassis leakage currents exceeding safe levels. Chassis leakage current created by an accessory or device connected to a non-isolated outlet may add to the chassis leakage current of the ultrasound system.

⚠ **WARNING:** Using an extension cord or multi-socket outlet setup to provide power to the ultrasound system, or to the system's peripheral devices may compromise the system grounding and cause your system to exceed leakage current limits.

⚠ **WARNING:** To avoid electrical shock and damage to the ultrasound system, power off and unplug the equipment from the AC power outlet before cleaning and disinfecting.

⚠ **Caution:** To avoid the possibility of static shock and damage to the system, avoid the use of aerosol spray cleaners on the monitor screens.

⚠ **Caution:** Do not use spray cleaners on the ultrasound system, as this may force cleaning fluid into the system and damage electronic components. It is also possible for the solvent fumes to build up and form flammable gases or damage internal components.

⚠ **Caution:** Do not pour any fluid onto the ultrasound system surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.

⚠ **Caution:** To ensure proper grounding and leakage current levels, it is the policy of Siemens to have an authorized Siemens representative or Siemens approved third party perform all on-board connections of documentation and storage devices to the ultrasound system.

⚠ **Caution:** To maintain the safety and functionality of the ultrasound system, maintenance must be performed every 12 months. Electrical safety tests must also be performed at regular intervals as specified by local safety regulations, or as needed.

EMC Note: Proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

System Reference

PATIENT DATA:
Documentation
Devices Ch 1

Possible Combinations with Other Equipment

⚠ **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the System Reference. If in doubt, consult Siemens service department or your local Siemens representative.

The SONOLINE Antares ultrasound system is capable of supporting documentation devices. Depending on how your system is configured, certain documentation devices will maintain power when the system is powered off. Although this will not cause harm to your documentation device, Siemens recommends that you power off each device whenever the system is powered off.

Some on-board peripheral devices must be installed by an authorized Siemens representative or by a Siemens-approved third party. Devices installed by other people will be at the user's risk and may void the system warranty.

Instructions for Use

System Setup	Ch 4
System Requirements	Ch 6

System Reference

RESOURCES: Accessories	Ch 2

Maintaining Data Integrity

Important Information

To ensure data integrity:

- To prevent the loss of data that results from power failures and other system "down" occurrences, you must archive important data, such as patient records, onto an external recording media, such as a CD or a network.
- Loss of data is to be expected and its retrieval is not normally possible under the following conditions: loss of power to the ultrasound system, hard disk failure, CPU failure, system lockup, and other similar causes.
- Should an abnormal system shutdown occur, retrieval of data not saved to the hard disk or not archived to an external recording media is not normally possible.

  An abnormal system shutdown occurs if you do not power off the ultrasound system using the green partial power on/off switch (⏻) located on the front of the system. Other examples of abnormal system shutdown include: equipment malfunction, loss of power, or pressing and holding the green partial power on/off switch longer than four seconds.

- Should an abnormal system shutdown occur, the system may initially require additional time to reboot or to respond to user input. This is due to the operating system performing a background scan of the hard disk to detect and segregate any truncated or corrupted files.

Caring for the Ultrasound System

It is the responsibility of the user to verify that the ultrasound system is safe for diagnostic operation on a daily basis. Each day, prior to using the system, perform each of the steps in the Daily Checklist.

All exterior parts of the ultrasound system, including the control panel, keyboard, transducers, and biopsy devices, should be cleaned and/or disinfected as necessary or between uses. Clean each component to remove any surface particles. Disinfect components to kill vegetative organisms and viruses.

Daily Checklist

Perform the following each day before using the ultrasound system:

- ❑ Visually inspect all transducers. Do not use a transducer that has a cracked, punctured, or discolored casing or a frayed cable.
- ❑ Visually inspect all power cords. Do not power on the ultrasound system if a cord is frayed or split, or shows signs of wear.
- ❑ Verify that the trackball, DGC slide controls, and other controls on the control panel appear clean and free from gel or other contaminants.

Once the ultrasound system is powered on:

- ❑ Visually check the on-screen displays and lighting.
- ❑ Verify that the monitor displays the current date and time.
- ❑ Verify that the transducer identification and indicated frequency are correct for the active transducer.

Maintenance

⚠ **Caution:** To maintain the safety and functionality of the ultrasound system, maintenance must be performed every 12 months. Electrical safety tests must also be performed at regular intervals as specified by local safety regulations, or as needed.

Repair

For questions regarding repair or replacement of any equipment parts on your system, contact your Siemens service representative.

Siemens Authorized Care

Installers and operators must observe any statutory regulations that govern the installation, operation, inspection, and maintenance of this equipment.

To ensure the safety of patients, operators, and third parties, the equipment must be inspected every 12 months, and the replacement of parts is performed as necessary. This maintenance must be performed by a qualified Siemens authorized representative. It is important to inspect the equipment more frequently if it is operated under extraordinary conditions.

Perform inspections and maintenance at the prescribed intervals to avoid worn and hazardous parts due to wear. Contact the Siemens service department for information regarding the required maintenance.

As manufacturers and installers of ultrasound equipment, Siemens cannot assume responsibility for the safety properties, reliability, and/or performance of the equipment, if:

- Installations, extensions, readjustments, modifications, additions, or repairs are carried out by persons not specifically authorized by Siemens.
- Components that affect the safe operation of the system are replaced by parts not authorized by Siemens.
- The electrical installation of the room where the equipment is located does not meet the power and environmental requirements stated in this manual.
- The equipment is not used in accordance with the operating instructions.
- The system is operated by personnel not adequately educated or trained.

Siemens suggests that you request any person who performs maintenance or repairs to provide you with a certificate showing:

- The nature and extent of the work performed
- Changes in rated performance
- Changes in working ranges
- Date of service
- Name of person or firm performing the service
- Signature of person performing the service

Technical documentation pertinent to the ultrasound system is available at an additional charge. However, this does not in any way constitute an authorization to conduct repairs or maintenance. Siemens refuses all responsibility whatsoever for repairs that are performed without the express written consent of the Siemens service department.

⚠ **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult Siemens service department or your local Siemens representative.

Caring for Documentation and Storage Devices

For information on the care of an optional documentation or storage device, refer to the manufacturer's operating instructions that accompanied the device.

Cleaning and Disinfecting

You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. Use universal precautions when cleaning and disinfecting. You should treat all portions of the ultrasound system that come in contact with human blood or other body fluids as if they were known to be infectious.

All exterior parts of the ultrasound system, including the control panel, transducers, and biopsy devices, should be cleaned and/or disinfected as necessary or between uses. Clean each component to remove any surface particles. Disinfect the components to kill vegetative organisms and viruses.

Cleaning Ultrasound System Surfaces

⚠ **WARNING:** To avoid electric shock and damage to the ultrasound system, always power off and unplug the equipment from the AC power outlet before cleaning and disinfecting.

⚠ **Caution:** To avoid the possibility of static shock and damage to the ultrasound system, avoid the use of aerosol spray cleaners on the monitor screens.

⚠ **Caution:** Do not clean the ultrasound system with chlorinated or aromatic solvents, acidic or basic solutions, isopropyl alcohol or strong cleaners such as ammoniated products, as these can damage the surface of the system. Use the recommended cleaning procedure.

⚠ **Caution:** Do not use spray cleaners on the ultrasound system, as this may force cleaning fluid into the system and damage electronic components. It is also possible for the solvent fumes to build up and form flammable gases or damage internal components.

⚠ **Caution:** Do not pour any fluid onto the ultrasound system surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.

The following instructions describe cleaning the surface of the ultrasound system, including the trackball and transducer holder.

To clean the surface of the ultrasound system:

1. Power off the ultrasound system and unplug the power cord from the power outlet.
2. Use a clean gauze pad or lint-free cloth, lightly moistened with a mild detergent, to wipe the surface of the ultrasound system.

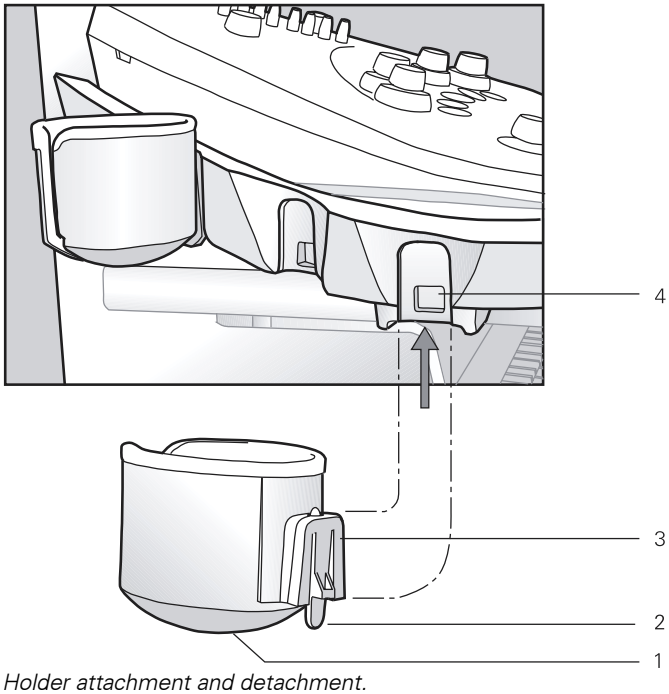
   Take particular care to clean the areas near the trackball and the slide controls. Ensure these areas are free of coupling agent (gel) and any other visible residue.

   Ensure that cleaning solution does not seep into the control panel, keyboard, or any other openings.
3. After cleaning, use a clean, lint-free cloth to dry the surface.
4. Reconnect the ultrasound system power cord into the power outlet.

To clean the holders for transducers and coupling gel:

1. Remove the holder from the ultrasound system:

   Reach under the holder to locate the tab on the holder. The tab extends below the point of attachment to the ultrasound system. Squeeze the tab towards the holder and pull the holder downward.



1 Holder
2 Tab
3 Support
4 Point of attachment

Holder attachment and detachment.

2. Clean the holder under running water, using a mild detergent and dry with a lint-free cloth.
3. Reattach the holder to the ultrasound system:

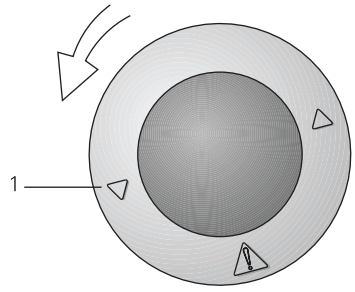
   Align the support on the holder directly below the point of attachment on the ultrasound system and firmly push upwards until the holder snaps into place.

To clean the trackball:

⚠ **Caution:** Do not drop or place foreign objects inside the trackball assembly because doing so may affect the trackball operation and damage the ultrasound system.

1. Disassemble the trackball:

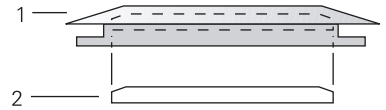
   Rotate the trackball bezel counterclockwise and lift up to remove the trackball bezel from the trackball assembly.



1 Trackball bezel

Trackball bezel positioned for removal from trackball assembly.

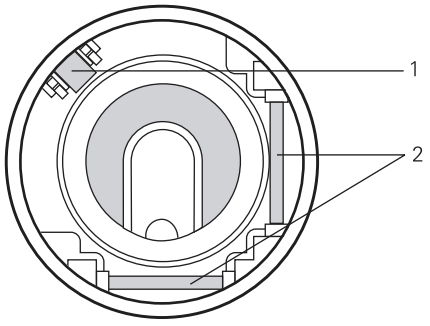
The bezel contains a gasket that should stay with the bezel. If the gasket should drop out of the bezel, then reposition it into the underside of the bezel.



1 Trackball bezel side view
2 Gasket side view

The gasket fits within the underside of the trackball bezel.

Lift the trackball out of the trackball assembly.



1 Idler wheel
2 X and Y encoders

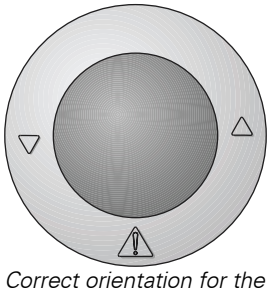
Inside of a disassembled trackball assembly.

2. Clean the bezel, gasket, and trackball with a cotton swab or lint-free pad moistened with mild detergent solution.
3. Clean the inside of the trackball assembly, particularly the X and Y encoders and the idler wheel, using a cotton swab moistened with mild detergent solution.
4. Allow the trackball components to completely dry before reassembly.
5. Reinstall the trackball and replace the trackball bezel:

   Place the trackball inside the trackball assembly.

   Place the trackball bezel over the trackball.

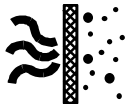
   Rotate the trackball bezel clockwise until it snaps into position and the bezel symbols are in the correct orientation.



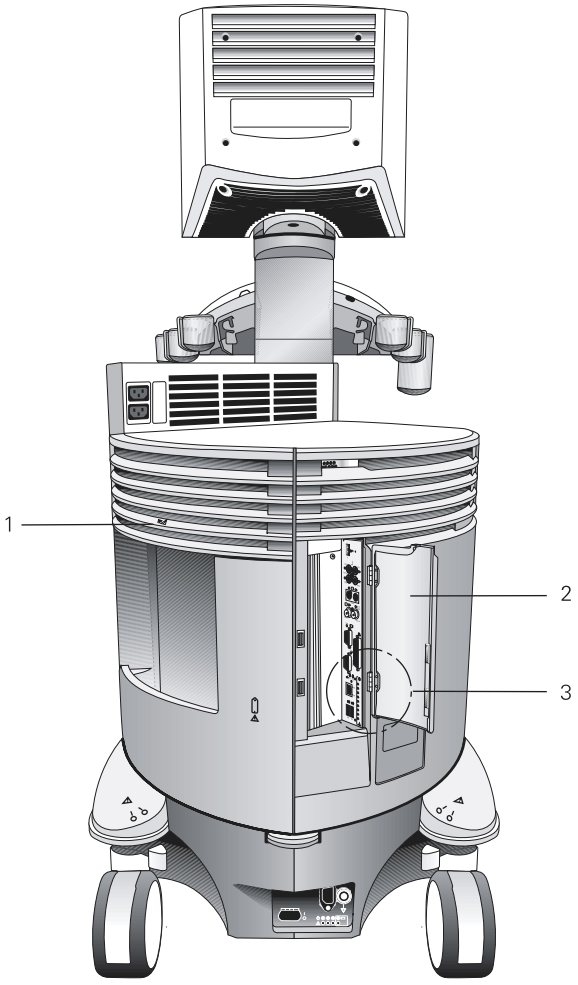
Correct orientation for the assembled trackball.

Cleaning the Air Filters

The ultrasound system has removable, washable air filters. The filters must be cleaned regularly to maintain proper system cooling. Check the air filters weekly, and clean as needed. Clean and reinstall both air filters according to the following instructions.



The filter locations are marked with the air filter symbol.



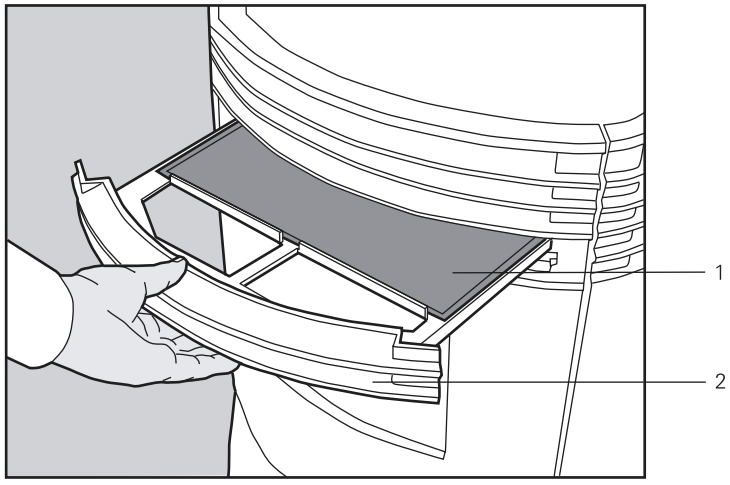
Location of air filters.

1 Location of back panel air filter
2 Input/output panel door
3 Location of input/output panel air filter

To remove and clean the back panel air filter:

⚠ **Caution:** Do not scrub, stretch, or bend the filter, or apply heat to the filter, as doing so could damage the filter.

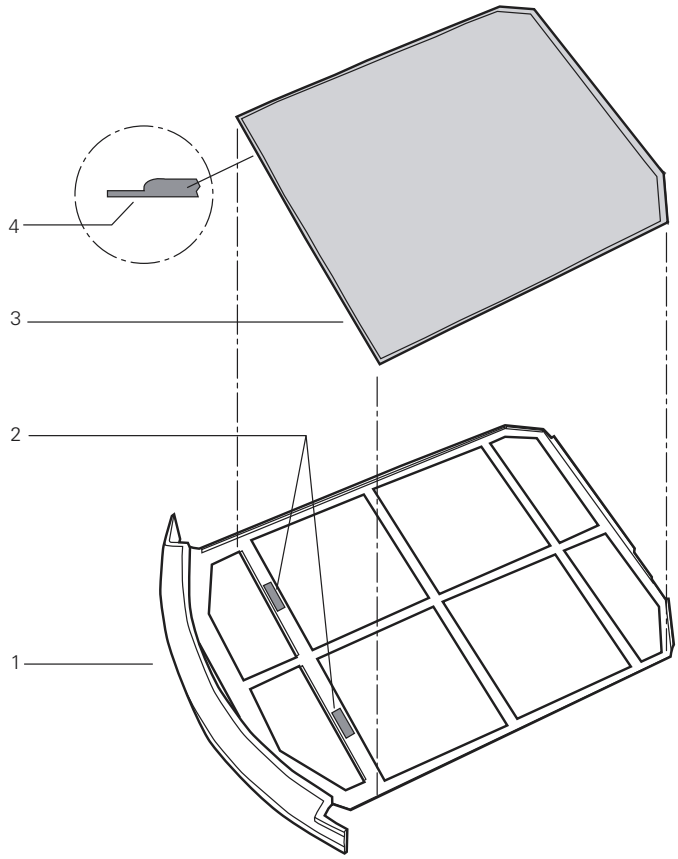
1. Power off and unplug the power cord from the power outlet.
2. Locate the air filter tray in the back panel and pull the tray out of the ultrasound system.



1 Back panel air filter
2 Back panel air filter tray

Removing the air filter tray from the back panel.

3. Remove the air filter from the tray.



1 Air filter tray
2 Hook and loop fasteners
3 Air filter
4 Flat side of air filter

Removing/replacing the air filter.

4. Rinse the air filter with running water and allow the filter to completely dry.

   To hasten drying, you may gently shake the filter, or blot the filter with a clean, lint-free cloth.

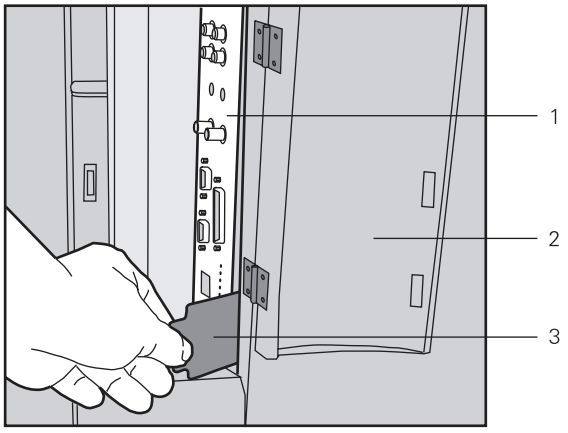
⚠ **Caution:** Do not insert a wet filter as this can damage the system.

5. Replace the air filter into the tray, positioning the filter flat side down, with the angled corners fitting into the back of the tray. The filter will fit into the back corners of the tray only if the filter is positioned flat side down.
6. Press the filter against the hook and loop fasteners on the tray.
7. Slide the air filter tray back into the ultrasound system.
8. Plug the power cord into the power outlet.

To remove and clean the input/output panel air filter:

⚠ **Caution:** Do not scrub, stretch, or bend the filter, or apply heat to the filter, as doing so could damage the filter.

1. Power off and unplug the power cord from the power outlet.
2. Open the door to the input/output panel. Locate the filter tab near the lower door hinge.
3. Grasp the filter by its tab and pull it out of the slot.



1 Input/output panel
2 Door to input/output panel
3 Input/output panel air filter

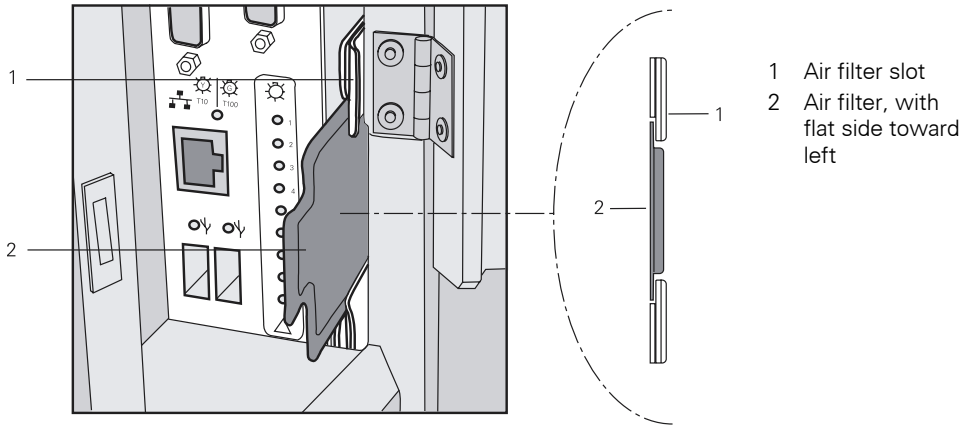
Removing the air filter from the input/output panel.

4. Rinse the air filter with running water and allow the filter to completely dry.

   To hasten drying, you may gently shake the filter, or blot the filter with a clean, lint-free cloth.

⚠ **Caution:** Do not insert a wet filter as this can damage the system.

5. Slide the air filter back into the ultrasound system, taking care to orient the flat side of the filter towards the left and to place the edges of the filter within the filter slot.
6. Close the door to the input/output panel.



1 Air filter slot
2 Air filter, with flat side toward left

Sliding the air filter into the air filter slot.

7. Plug the power cord into the power outlet.

Caring for Transducers

Instructions for Use

Transducer Sheaths 2-41

⚠ **WARNING:** Always place a sterile, non-pyrogenic transducer sheath on a transducer used in procedures requiring sterility.

⚠ **WARNING:** To minimize the risk of cross-contamination and infectious diseases, endocavity transducers must be cleaned and high-level disinfected after each use. A sterile, non-pyrogenic transducer sheath must be in place during procedures requiring sterility.

⚠ **WARNING:** During neurosurgical procedures, if a transducer becomes contaminated with tissue or fluids of a patient known to have Creutzfeld-Jacob disease, the transducer should be destroyed as it cannot be sterilized.

⚠ **WARNING:** When using an endocavity or intraoperative transducer with a CF type applied part, the patient leakage currents may be additive.

⚠ **WARNING:** The outer surfaces of an endocavity or intraoperative transducer should be checked to ensure there are no unintended rough surfaces, sharp edges, or protrusions that may cause a safety hazard.

⚠ **Caution:** Transducers are sensitive instruments – irreparable damage may occur if they are dropped, knocked against other objects, cut, or punctured. Do not attempt to repair or alter any part of a transducer, contact your local Siemens representative.

⚠ **Caution:** To avoid cable damage, do not roll the ultrasound system over transducer cables.

⚠ **Caution:** To avoid damage to the transducer, do not use transducer sheaths containing an oil-based coating or petroleum- or mineral oil-based ultrasound coupling agents. Use only a water-based ultrasound coupling agent.

⚠ **Caution:** Follow all instructions provided by manufacturers of sterile goods (transducer sheaths) to ensure proper handling, storage, and cycling of all sterile goods.

Take extreme care when handling or storing transducers. They must not be dropped, jarred, or knocked against other objects. Do not allow transducers to come into contact with any sharp-edged or pointed object.

Protective case

Due to the mechanical sensitivity of transducers, Siemens recommends that you always use the transducer case when you ship a transducer or transport it from one place of examination to another. The case is specially designed to protect the sensitive parts of the transducer. Be sure that all parts of the transducer are properly placed inside the case before you close the lid.

Storage

Store transducers in a clean and dry environment. Extreme temperatures or humidity may damage a transducer.

Instructions for Use

Environmental Requirements Ch 6

Repair

Do not attempt to repair or alter any part of the transducer. Contact your service representative at Siemens immediately if a transducer appears to be damaged or malfunctions in any way.

Cleaning and Disinfecting Transducers

⚠ **WARNING:** To avoid electrical shock and damage to the system, disconnect the transducer prior to cleaning or disinfecting.

⚠ **WARNING:** Disinfectants and cleaning methods listed are recommended by Siemens for compatibility with product materials, not for biological effectiveness. Refer to disinfectant label instructions for guidance on disinfection efficacy and appropriate clinical uses.

⚠ **Caution:** Do not sterilize transducers using hot steam, cold gas, or Ethylene Oxide (EOG) methods. Before applying any other methods that might be recommended by manufacturers of sterilization equipment, please contact your Siemens representative.

⚠ **Caution:** To avoid damage to the transducer, observe the immersion levels indicated for each transducer type. Do not immerse or allow the cable or connector of a transducer to become wet.

⚠ **Caution:** The transducers have been designed and tested to be able to withstand high-level disinfection as recommended by the manufacturers of approved disinfectant products. Carefully follow the disinfectant manufacturer's instructions.

⚠ **Caution:** Do not use abrasive cleaning agents, organic solvents such as benzene, isopropyl alcohol, or phenol-based substances, or cleaning agents containing organic solvents to clean or disinfect transducers. These substances can damage the transducers.

All transducers should be cleaned and disinfected prior to their use on each patient. Endocavity transducers require high-level disinfection prior to use.

Instructions for Use

High-level disinfection 2-38
Approved List of Disinfectants 2-40

To clean and disinfect a transducer:

1. Disconnect the transducer from the system.
2. Moisten a clean gauze pad with water and wipe the transducer to remove any gel or particles remaining on the transducer. If water is not effective, you may use a pre-enzyme cleaner.
3. Carefully wipe the entire transducer, including the cable and connector.
4. To disinfect the transducer, take care to keep the cable strain relief and connector of the transducer dry while immersing the transducer in an approved disinfectant to the level indicated in the following illustration.
5. Carefully follow the disinfectant manufacturer's instructions.
6. After cleaning or disinfecting, use a clean cloth to dry the transducer.

Instructions for Use

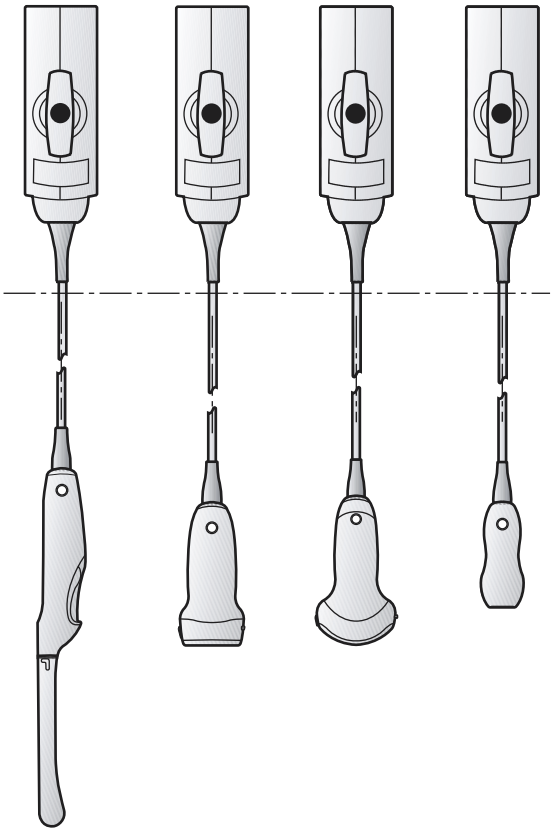
Approved List of Disinfectants 2-40

To high-level disinfect a transducer:

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. Take care to keep the cable strain relief and connector of the transducer dry while immersing the transducer in an approved disinfectant to the level indicated in the following illustration.
4. Carefully follow the manufacturer's instructions for high-level disinfection.
5. After high-level disinfecting, use a clean cloth to dry the transducer.

⚠ **Caution:** To avoid damage to the transducer, observe the immersion levels indicated for each transducer type.

Note: Transducers meet Ingress Protection level IPX8 of EN 60539 and IEC 60539 to the depth of the immersion line shown in the illustration. Endocavity transducers exceed minimum Ingress Protection level IPX7 of IEC 60601-2-18 to the depth of the immersion line shown in the illustration.



Approved List of Disinfectants

The following matrix provides a list of approved disinfectants for all transducers.

Note: Cidex OPA and Gigasept FF may discolor transducer housings. There is no associated degradation of imaging performance or transducer reliability.

	Cidex	Cidex Plus	Cidex OPA	Theracide	Dispatch	Gigasept FF
C5-2	✓	✓	✓	✓	✓	NA
CX5-2	✓	✓	✓	✓	✓	NA
CH6-2	✓	✓	✓	NA	✓	✓
EC9-4	✓	✓	✓	✓	✓	NA
P10-4	✓	✓	✓	✓	✓	✓
PH4-1	✓	✓	✓	NA	✓	✓
VF7-3	✓	✓	✓	✓	✓	NA
VFX9-4	✓	✓	✓	✓	✓	NA
VF10-5	✓	✓	✓	✓	✓	NA
VF13-5	✓	✓	✓	✓	✓	NA
VFX13-5	✓	✓	✓	✓	✓	NA

✓ = compatible

NC = not compatible

NA = not applicable (not tested)

Caring for Transducer Accessories

Instructions are provided for the following accessories for transducers:

- Transducer Sheaths
- Gel Pads
- Needle Guide Bracket Kits

Transducer Reference

Attachment Procedures Ch 3

Instructions for Use

Cleaning and Disinfecting 2-44

Transducer Sheaths

⚠ **WARNING:** There have been reports of severe allergic reactions to medical devices containing latex (natural rubber). Health care professionals are advised to identify latex-sensitive patients and to be prepared to treat allergic reactions promptly. For additional information in the U.S.A., refer to FDA Medical Alert MDA91-1.

⚠ **WARNING:** To minimize the risk of cross-contamination and infectious diseases, endocavity transducers must be cleaned and high-level disinfected after each use. A sterile, non-pyrogenic transducer sheath must be in place during procedures requiring sterility.

Note: Siemens recommends that you follow all instructions provided by manufacturers of sterile goods (transducer sheaths) to ensure proper handling, storage, and cycling of all sterile goods.

Using a disposable latex transducer sheath on a transducer reduces the possibility of cross-contamination. Always use a protective transducer sheath for endocavity exams, and when scanning an open wound or an area where the skin is not intact.

Storage

⚠ **Caution:** Do not store transducer sheaths in direct sunlight, as ultraviolet damage can result.

Latex products have a limited shelf life, and should be stored in a cool, dry, dark place with an ambient temperature between -5°C and +40°C and up to 80% relative humidity at +40°C. Before use, examine these products for any material flaws. Some packaging may list an expiration date. Any product showing flaws, or whose expiration date has passed, should not be used.

Gel Pad

Before use, examine the gel pad for any material flaws. Thinning, bulging, or brittleness of the material indicates damage. Any product showing flaws should not be used.

Storage

Do not store the gel pads below 40°F (5°C) nor above 135°F (57°C). Gel pads have a limited shelf life. Before use, examine these products for any material flaws. Some packaging may list an expiration date. Any product showing flaws, or whose expiration date has passed, should not be used.

Needle Guide Bracket Kits

Needle guide bracket kits are available for biopsy and puncture procedures for specific transducers.

Storage and Transportation

Always clean and sterilize or high-level disinfect components used in a needle puncture or biopsy procedure after each use.

Storing or transporting the EC-1 Bracket Kit

- Do not use the carrying case for storing the bracket assembly. If the carrying case is used for storage, it may become a source of infection.
- The bracket assembly must be stored and transported under the following environmental conditions:
  - Ambient temperature: -10°C to 60°C
  - Relative humidity: 30% to 95% (no condensation)
  - Atmospheric pressure: 700 hPa to 1060 hPa
- Between examinations, keep the bracket assembly in a sterile environment.
- When the biopsy adapter is transported to a different hospital or clinic or is sent to your Siemens representative for repair, be sure to sterilize it and keep it in the carrying case for transportation to prevent infection.

Storing or transporting the SG-1, SG-2, SG-3, SG-4, and SG-5 Bracket Kits and EC9-4 Disposable Endocavity Needle Guide

Refer to the in-box instructions for storage and transportation information.

Cleaning, Disinfecting, and Sterilizing Transducer Accessories

⚠ **WARNING:** Ensure the accessories for a transducer are properly cleaned, sterilized or disinfected as appropriate before each use to avoid possible patient contamination.

Transducer Reference

Attachment Procedures Ch 3

Instructions are provided for the following accessories for transducers:

- Needle Guide Bracket Kits

Needle Guide Bracket Kits

Needle guide bracket kits are available for specific transducers. Instructions follow for the cleaning, disinfecting, and sterilization of each kit. Bracket assemblies should be cleaned and sterilized or high-level disinfected after each use.

Instructions for Use

Transducer Accessories Care 2-41

EC-1 Needle Guide Bracket Kit for Endocavity Transducers

⚠ **WARNING:** The EC-1 Needle Guide Bracket kit is packaged non-sterile. Sterilize this product prior to its first use.

Prior to sterilization, clean the bracket assembly.

To clean the bracket assembly:

1. Rinse the bracket under water and remove all debris. Avoid using a brush as it may damage the needle guide bracket.
2. Visually inspect the guide to make sure all debris is removed.
3. Wipe off water on the bracket assembly using a sterile cloth or sterile gauze.

To sterilize the bracket assembly:

Use sterile technique to perform this procedure.

1. Sterilize assembly using high-pressure steam sterilization (130°C (266°F) for an exposure time of 10 minutes), EOG (ethylene oxide) sterilization, or hydrogen peroxide plasma sterilization.
2. Perform one of the gas sterilization methods listed below:

Sterilization Method	Gas Concentration	Procedure			
		Temperature	Humidity	Pressure	Time
Ethylene Oxide gas	10%	50°C (122°F)	50%	Maximum operating pressure 980 hPa (1.0 kgf/cm^2)	7 hours
Hydrogen Peroxide Plasma	STERRAD	For details, refer to the operation manual for the STERRAD ® sterilization system.			

3. After gas sterilization, thoroughly degas (aerate) the biopsy adapter to remove all gas residues.

SG-1, SG-2, SG-3, SG-4, and SG-5 Bracket Assemblies

⚠ **WARNING:** The needle guide is packaged sterile and is a single-use item. Do not use if the packaging indicates signs of tampering or if the expiration date has passed.

The needle guide for use with the SG-1, SG-2, SG-3, SG-4, and SG-5 bracket assemblies is a single-use item. Refer to the in-box instructions for disposal instructions.

Refer to the in-box instructions for cleaning and high-level disinfecting procedures for the bracket assemblies.

EC9-4 Disposable Endocavity Needle Guide

⚠ **WARNING:** The needle guide is packaged sterile and is a single-use item. Do not use if the packaging indicates signs of tampering or if the expiration date has passed.

The disposable endocavity needle guide is a single-use item. Refer to the in-box instructions for disposal instructions.

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Control Panel

The controls and keys for all imaging modes, parameters, documentation, and on-screen selections are designed to promote quick learning and recognition of the controls and keys on the control panel.

Control Panel on the SONOLINE Antares ultrasound imaging system.

Control Panel Overlays

Language overlays for the control panel are available. The locations and functions of the keys and controls are not impacted by the overlay.

System Reference

RESOURCES:
Examples of overlays Ch 2

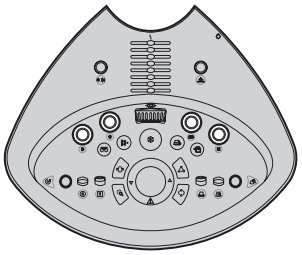
Control Panel Lighting

The system provides two levels of lighting on the control panel: when the ultrasound imaging system is in use, the control panel is back-lit, and when a control or key is active, the lighting intensity of the active control or key is increased.

Note: The lighting for the trackball control keys (**NEXT**, **PRIORITY TOOL**, **UPDATE VIEW**, **SELECT**) stays constant.

Mode Controls

There are four mode controls: **2D**, **D** (Doppler), **C** (Color), and **M**. Each mode control allows you to activate the mode, adjust the gain setting for the mode, and select additional mode features.



2D

The **2D** control is a multi-function control.

2D-mode.

Pressing the **2D** control activates 2D-mode, deactivates all active modes other than 2D-mode, and displays the **Image** task card on the image screen with the 2D-mode Parameter menu.

Rotating the **2D** control clockwise increases the 2D gain; rotating the control counterclockwise decreases the gain. The gain value displays on the 2D-mode Parameter menu next to the 2D status icon.

Rotating the **2D** secondary mode control (outer ring) selects general 2D-mode imaging, Tissue Harmonic Imaging, or Cadence™ Contrast Agent Imaging.

The selection is displayed on the 2D-mode Parameter menu next to the 2D status icon:

- **GEN:** General 2D-mode imaging
- **THI:** Tissue Harmonic Imaging
- **CCAI:** Cadence Contrast Agent Imaging

During 3-Scape imaging in the **Compose** task card, the **2D** control is assigned to rotation of the active quadrant around the normal axis.

D

The **D** control is a multi-function control.

Doppler.

Use the system presets to select the default action of the **D** control (cursor on/off) and to configure the system to initiate **Cursor Audio Mode** whenever the **D** control is pressed. When **Cursor Audio Mode** is active, you can audibly interrogate vessels with Doppler in 2D-mode before displaying the Doppler spectrum.

Doppler/M-mode Setup

Cursor Off – Pressing the **D** control activates Doppler and displays the **Image** task card on the image screen with the Doppler Parameter menu. The system displays the Doppler spectrum and the 2D image according to the format selected in the Presets menu. Pressing the **D** control again exits Doppler.

Cursor On – Pressing the **D** control displays the **Image** task card on the image screen with the Doppler Parameter menu and a Doppler cursor for positioning in the 2D image; pressing the control a second time activates Doppler and displays the Doppler spectrum and the 2D image according to the format selected in the Presets menu. Pressing the **D** control again exits Doppler.

Rotating the **D** control clockwise increases the Doppler gain; rotating the control counterclockwise decreases the gain. The gain value displays on the Doppler Parameter menu next to the Doppler status icon.

Rotating the **D** secondary mode control (outer ring) selects Doppler modes for future use and reselects pulsed wave Doppler. The selection is displayed on the Doppler Parameter menu next to the Doppler status icon.

During 3-Scape imaging in the **Compose** task card, the **D** control is assigned to rotation of the active quadrant around the axial axis.

C

The **C** control is a multi-function control.

Color.

Pressing the **C** control activates and deactivates Color and displays the **Image** task card with the Color Parameter menu.

Rotating the **C** control clockwise increases the Color gain; rotating the control counterclockwise decreases the gain.

Rotating the **C** secondary mode control (outer ring) selects either Color or Power modes.

The selection is displayed on the Color and Power Parameter menu next to the Color status icon:

- **VEL:** Color mode
- **PWR:** Power mode

During 3-Scape imaging in the **Compose** task card, the **C** control is assigned to rotation of the active quadrant around the lateral axis.

M

The **M** control is a multi-function control.

M-mode.

Use the system presets to select the default action of the **M** control (cursor on/off).

Cursor Off – Pressing the **M** control activates M-mode and displays the **Image** task card on the image screen with the M-mode Parameter menu. The system displays the M-mode sweep and the 2D image according to the format selected in the Presets menu. Pressing the **M** control again exits M-mode.

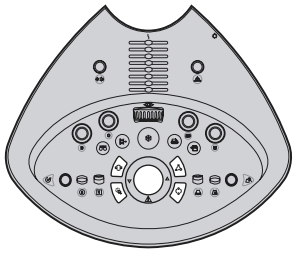
Doppler/M-mode Setup

Cursor On – Pressing the **M** control displays the **Image** task card on the image screen with the M-mode Parameter menu and an M-mode cursor for positioning in the 2D image; pressing the control a second time activates M-mode and displays the M-mode sweep and the 2D image according to the format selected in the Presets menu. Pressing the **M** control again exits M-mode.

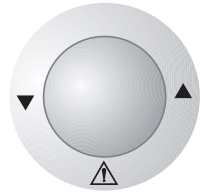
Rotating the **M** control clockwise increases the M gain; rotating the control counterclockwise decreases the gain. The gain value displays on the M-mode Parameter menu next to the M status icon.

The **M** secondary mode control (outer ring) is reserved for future use.

Trackball Controls



The trackball is the main interactive control used with on-screen objects. Use the trackball to position tools, such as the ROI, Doppler cursor, and measurement calipers, and to make selections from the on-screen menus. You can also use the trackball in conjunction with the trackball keys located on the control panel.



Trackball.

Select

Select.

The **SELECT** key functions as a point and select device when used with the trackball. Use the **SELECT** key to make selections from on-screen menus and to assign trackball control to on-screen tools (for example, Doppler gate and Distance measurement tools). When a tool is active, the trackball pointer (cursor) is not visible. To redisplay the pointer, press the **SELECT** key.

The function of the **SELECT** key is dependent on the active task card.

Active Task Card	Function Description
Image	When the pointer (cursor) is positioned over the image area, pressing the **SELECT** key alternates the trackball function between a pointer (cursor) and the default mode tool for the active mode (for example, the **2D FOV**).
	When the pointer is positioned over the Parameter menu, the **SELECT** key allows you to interact with the menu and group boxes.
Calcs	When the pointer (cursor) is positioned over the image area, pressing the **SELECT** key anchors a measurement caliper and generates the next caliper for positioning with the trackball.
	When the pointer is positioned on the left of the screen, the **SELECT** key selects measurement tools (for example, Distance, Volume, or Velocity), measurement labels, and pictograms.
Review	Allows you to select images or tools.
Compose	Allows you to select images or tools.

Update View

The function of the **UPDATE VIEW** key is dependent on the active mode and the active task card.

Update View.

Active Task Card	Function Description
Image	Enables TEQ (optional feature) when the **UPDATE VIEW** key is not assigned to another function. Double-click the **UPDATE VIEW** key to exit TEQ.
Image (Dual)	Selects the active image of a dual format. Toggles dual display with a full-screen display of the active image when you double-click the **UPDATE VIEW** key.
Image (Doppler)	Toggles a real-time 2D image with a real-time Doppler spectrum.
Image (M-mode)	Toggles a real-time 2D image with a real-time M-mode image.
Image (SieScape and 3-Scape)	Starts or cancels the acquisition process.
Review	Toggles the selected display format with a full-screen display format when you double-click the **UPDATE VIEW** key.
Compose (3-Scape)	Toggles four-quadrant display with a full-screen display of the active quadrant when you double-click the **UPDATE VIEW** key.

To double-click the **UPDATE VIEW** key, press the **UPDATE VIEW** key twice in quick succession.

Priority Tool

The **PRIORITY TOOL** key changes which tool is currently under the control of the trackball. A tool can be a mode tool (**2D FOV**, **D Gate**, **M Line**, **C ROI**), or a set of calipers. The function of the **PRIORITY TOOL** key is dependent on the active task card.

Priority Tool.

Active Task Card	Function Description
Image	Alternates the trackball control between mode tools. For example, during Doppler and 2D-mode, pressing the **PRIORITY TOOL** key alternates the trackball control between the Doppler mode tool, **D Gate**, and the 2D-mode tool, **2D FOV**. The Tool icon in the lower right of the screen indicates the tool in use for the active priority mode.
Calcs	Cycles through the sets of calipers for use with the trackball.
Review	No action.
Compose	During 3-Scape imaging, when the active (selected) quadrant is the volume, toggles the volume rotation function with the plane rotation function.

Next

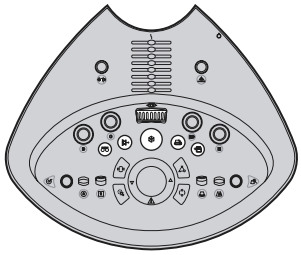
The **NEXT** key cycles through the functions of the tool currently under control of the trackball. For example, during Doppler, the active mode tool is **D Gate**. Pressing the **NEXT** key toggles the gate positioning with the gate steering functions. The function of the **NEXT** key is dependent on the active task card.

Next.

Active Task Card	Function Description
Image	Cycles through the currently active mode tool functions. For example, during Color, the **NEXT** key cycles through the Color ROI positioning, sizing, and steering functions (steering is available only for linear transducers). The Next icon in the lower right of the screen indicates the function under control of the trackball. When the trackball is not assigned to a function (free cursor), the **NEXT** key displays the **Calcs** task card.
Calcs	Toggles the first endpoint (marker) of the active set of calipers with the second endpoint (marker) of the active set of calipers. If a measurement has more than two measurement markers, then the **NEXT** key cycles through the markers.
Review	No action.
Compose	During SieScape™ Panoramic imaging, toggles the rotate function with the pan function. During 3-Scape imaging, cycles through the pan function and the available rotate functions, and anchors polygon endpoints.

Archiving Controls

Use the archiving controls to access documentation and storage devices for printing, storing, or retrieving stored images.



Freeze

Freezes the image or sweep. When you suspend real-time imaging, the system activates CINE. You can also use the **FREEZE** key to access the **Calcs** task card, when defined in the system presets.

Freeze.

If an image or sweep is already frozen, pressing the **FREEZE** key resumes real-time imaging.

SieScape and 3-Scape Imaging

Basic System 2

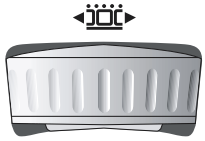
Before acquisition, suspends real-time imaging.

During acquisition, ends the acquisition process and displays the acquired data in the **Compose** task card.

From the **Compose** task card, activates the **Image** task card and resumes real-time imaging.

CINE Wheel

Reviews images in a continuous display of stored data in a forward or backward direction, or frame-by-frame, either forward or backward.



CINE Wheel.

Active Task Card	Function Description
Image **Calcs**	▪ Review CINE images by slowly rotating the **CINE WHEEL**. ▪ Review CINE images continuously by quickly rotating the **CINE WHEEL**.
Review	No action.
Compose	During SieScape imaging, cycles through frames. During 3-Scape imaging, steps through the volume, slice by slice.

VCR

Toggles the record function with the pause function if the VCR is on and a tape is inserted. The VCR controls are located in the VCR group box on the **Image** task card.

VCR.

The VCR key illuminates when the record function is active.

Clip/Vol Save

Saves the currently displayed 3-Scape volume to the system's hard disk.

Clip/Vol Save.

Print/Store

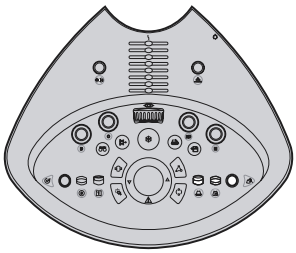
The control panel has two **PRINT/STORE** keys. Each **PRINT/STORE** key prints and/or saves an image as configured in the system presets.

Print/Store

Print/Store.

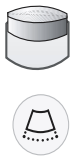
Print/Store.

Image Controls



Depth

Changes the imaging depth. Push up on the **DEPTH** control to decrease depth; push down on the control to increase depth.



Depth.

Focus

Changes the location of the focal point(s) along the depth marker. Push up on the **FOCUS** control to position the focal point(s) toward the top of the image (shallower - closer to the skin line), and push down on the control to position the focal point(s) toward the bottom of the image (deeper - farther from the skin line).

Focus.

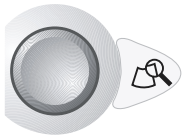
Zoom

Changes the image magnification. Pressing the **ZOOM** control magnifies the image. Rotating the **ZOOM** control clockwise increases the zoom factor; rotating the control counterclockwise decreases the zoom factor.

In the **Compose** task card during 3-Scape Imaging, magnification is applied to the active (selected) quadrant.

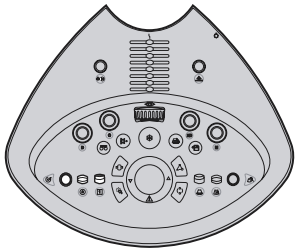
When an arbitrary slice is magnified, the system magnifies all arbitrary slices at their intersection point, using the same zoom factor.

In the **Review** task card, the **ZOOM** control has no effect.



Zoom.

Menu Control



Provides a method of navigating and interacting with on-screen menus and objects similar to the combination of the trackball and **SELECT** key combination. Rotating the **MENU** control navigates the menus. To adjust the setting of a menu selection, press and then rotate the **MENU** control. Press the control again to confirm the setting and disengage the control.

Menu.

Universal 2

A mode-dependent control that performs different functions based on the active task card.

Universal 2.

Active Task Card	Function Description
Image	Adjusts the settings of parameters depending on the active imaging mode.
	Mode — **Universal 2 control** 2D-mode — Number of Focal Points M-mode — Sweep Speed Doppler — Baseline Color — Flow State
	Push up on the control to increase a setting; push down on the control to decrease a setting.
Calcs	Activates the Undo function.
	Push up or down on the control to undo trace measurements in the sequence created one step at a time.
Review	Changes the display format (number of images displayed on the screen).
Compose	During SieScape CINE review, selects **Redisplay** from the SieScape Parameter menu.
	During 3-Scape imaging, adjusts the **Display** setting on the 3-Scape Parameter menu.

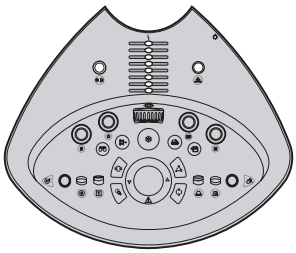
Universal 1

A mode-dependent control that performs different functions based on the active task card.

Universal 1.

Active Task Card	Function Description
Image	Adjusts the settings of parameters depending on the active imaging mode.
	Mode — **Universal 1 control** 2D-mode — Transmit Frequency M-mode — Transmit Frequency Doppler — PRF Color — PRF
	Push up on the control to increase a setting; push down on the control to decrease a setting.
Calcs	Activates the Delete function.
	Push up on the control to delete measurements in the sequence created.
Review	Scrolls through pages of images displayed on the **Review** task card.
Compose	During SieScape imaging, incrementally increases or decreases the scale of a SieScape image. Push up on the control to increase the scale. Push down on the control to decrease the scale.
	During 3-Scape imaging, cycles through the quadrants. Push up on the control to cycle quadrants in the clockwise direction. Push down on the control to cycle quadrants in the counter-clockwise direction.

Other Controls



Speaker Microphone

Rotating the control adjusts the speaker volume for the system. Pressing the control turns the microphone on and off during VCR recording.

Speaker Microphone.

Transmit Power

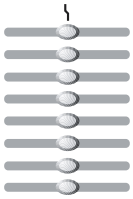
Adjusts the transmit power and the corresponding acoustic pressure delivered through the transducer to the patient. Rotate the **TRANSMIT POWER** control clockwise to increase the transmit power; rotate the control counterclockwise to decrease the transmit power.

Transmit Power.

Depth-Gain Compensation

Adjusts the gain for the 2D image to compensate for weak signals. The gain range is depth-dependent for the active transducer frequency. Push a **DGC** slider control to the right to increase the compensation; push a slider control to the left to decrease the compensation.

Note: Use the system presets menu to activate the display of the DGC curve and to specify the default image depth setting for depth-gain compensation.



DGC.

Basic System

Keyboard

Use the alphanumeric keyboard for entering patient data, annotating clinical images, and configuring the system. The keyboard slides out from under the control panel and is arranged like a standard computer keyboard with the addition of function keys, standard control keys, and other alphanumeric keys.

Function Keys

The function keys, located in a row across the top of the keyboard, access the **Patient Registration** form, patient **Report**, patient browser, **Filming** screen, system presets, and the online **Help**.

Patient

Patient

Displays the **Patient Registration** form used for entering patient and examination information. If the **Patient** key is pressed while the **Patient Registration** form is displayed, then the system registers the patient and begins the examination.

Report

Report

Displays the patient **Report** for the current examination. You can view, edit, save, or print the report.

Note: The system saves the report as a screenshot image.

Browser

Browser

Displays the patient browser used to search for patient records and to view patient data.

Film

Displays the **Filming** screen. You can preview the images prior to sending them to an external documentation device.

Film

Presets

Displays the system presets menu options for you to modify and customize the system, including general system settings, split screen formats, and user-defined measurements. If the **Presets** key is pressed while the system presets are displayed, then the system automatically saves the settings on the displayed system presets page.

Presets

Help

Provides information about the control panel, keyboard, screen elements, and procedures for beginning an examination.

Help

Other Alphanumeric Keys

Annotation Cursor

Activates the annotation function. Roll the trackball to position the text cursor and then use the keyboard to enter text.

Annotation cursor.

Text A, Text B, Text C, Text D

System-defined annotation keys. Places positional and qualifying text on the image screen to the right of the most recent annotation.

Text A.

Arrow

Displays an annotation arrow on the image screen. To position the arrow, roll the trackball. To rotate the direction of the arrow, press the **NEXT** key. To toggle the Position and Rotate functions, press the **NEXT** key and roll the trackball. Press the **SELECT** key to anchor the arrow and disengage the trackball.

Arrow.

Home

Repositions the text cursor to the predetermined Home position. To change the Home position, roll the trackball to the new position and press the **Set Home** key.

Home.

Set Home

Sets the default Home position of the text cursor.

Set Home.

Hide Text

Hides the text cursor and all text on the screen. To redisplay the hidden text, press the **Hide Text** key again.

Note: The green LED next to the key is illuminated when this function is enabled.

Hide text.

Clear Screen

Clears the screen of all user-inserted graphics, such as annotations and pictograms.

Clear screen.

Clear Line

Deletes all text annotations on the line where the text cursor is positioned.

Clear line.

Picto

Displays the first available pictogram for the selected application.

To remove the pictogram selection from the image screen, select the **Delete current pictogram** button on the lower left of the screen when the **Calcs** task card is active.

Picto.

Marker

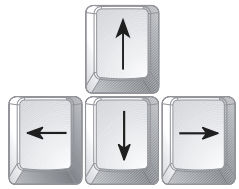
Toggles display of the transducer marker. The transducer marker displays over the pictogram on the image screen. To position the marker, use the trackball. To rotate the marker, press the **NEXT** key.

To toggle the transducer marker between the **Position** and **Rotate** functions, press the **NEXT** key. Press the **SELECT** key to anchor the transducer marker and disengage the trackball.

Marker.

Arrows

Repositions the text cursor in the direction corresponding to the **Arrow** key pressed.



Arrows.

Alt

Accesses special characters located on the alphanumeric keyboard.

Alt.

Alt Gr

Only non-English keyboards. Accesses special characters located on the alphanumeric keyboard.

Alt Gr.

Backspace

Deletes one character at a time from right to left.

Backspace.

Caps Lock

Locks all keyboard letter keys in uppercase.

Note: The green LED next to the key is illuminated when this function is enabled.

Caps lock.

End

Highlights the last selection in a drop-down menu.

End.

Enter

Positions the cursor at the beginning of the next line of text or field and accepts entered data.

Enter.

Shift

Accesses the uppercase letters and the character that is on the top half of a number or punctuation key.

Shift.

Space

Inserts a blank space.

Space.

Tab

Positions the cursor in the beginning of the next available field in the **Patient Registration** form or a patient report.

Tab.

Blank

No function.

Blank.

Footswitch

Use the optional footswitch as an alternative to operating keys on the control panel.

Pedal	Assigned Function	Equivalent Key Located on the Control Panel
Left	**CLIP/VOL SAVE** key	
Middle	**FREEZE** key	
Right	**PRINT/STORE** key	

Instructions for Use

CLIP/VOL SAVE key 3-16
FREEZE key 3-15
PRINT/STORE key 3-16
Footswitch Connection Ch 4

Task Cards

The primary tasks during an examination are grouped into task cards that follow the high-level workflow of an examination. The available task cards are **Image**, **Calcs**, **Review**, and **Compose**. Images are acquired and optimized in the **Image** task card, measurements are made in the **Calcs** task card, data is reviewed in the **Review** task card, and any post-processing functions are done in the **Compose** task card.

Image Task Card

The **Image** task card is used for selecting the imaging mode and the image format and for optimizing the settings such as dynamic range, persistence, and edge enhancement or for selecting an exam type or transducer that contains pre-configured, optimized settings.

The **Image** task card also provides controls for functions other than imaging parameters. VCR recording, ECG settings, image formatting, and the update styles settings are organized in group boxes.

Parameter Menu Selections

Mode-specific menus and selections display on the left side of the screen in the **Image** task card. Each imaging mode has a mode-dependent Parameter menu used to adjust imaging parameters.

Note: A Parameter menu may have two pages of selections. To access the menu selections, roll the trackball to the **Page 1 of 2** indicator or the **Page 2 of 2** indicator on the Parameter menu and then press the **SELECT** key.

System Reference

IMAGE:
TEQ Technology Ch 2
CCAI Ch 9

2D-Mode Parameter Menu Selections

Menu Selection	Description
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer in 2D-mode.
# Foc (Number of focal zones)	Selects the number of focal zones.
DR (Dynamic Range)	Controls the overall contrast resolution of the image.
R/S (Resolution/Speed)	Adjusts the balance between the image line density (resolution) and the frame rate.
Edge (Edge Enhancement)	Distinguishes the contours of a structure during real-time imaging.
Persist (Persistence)	Increasing Persistence creates a visible smoothing effect by maintaining lines of image data for each frame of imaging.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels.
Tint	Changes the color of the image.
SieClear	Activates SieClear™ multi-view spatial compounding.
TEQ Set	Saves a TEQ gain offset for the current 2D-mode imaging feature.
Timer	For systems installed with the Cadence™ Contrast Agent Imaging (CCAI) option: Activates or deactivates the on-screen Timer. The Timer displays the time elapsed since the timer was started and records the value on frames saved to the CINE buffer.
Trig (Trigger)	For systems installed with the CCAI option: When enabled, limits the frame rate to the selected maximum value. **Note:** This selection is not available during Doppler or M-mode imaging.
Imaging Technique	Sets the imaging technique used during CCAI imaging: ▪ Agent Emission Imaging (High MI) ▪ Ensemble Contrast Imaging (Low MI)
Burst FR	For systems installed with the CCAI option: Sets the frame rate to be used during the Burst process. The frame rate determines the duration of the Burst process.
Start Burst	Initiates the Burst process during CCAI imaging. **Note:** After the Burst process completes (that is, when the number of frames set in **Burst FR** have occurred), the system automatically activates **ECI-Low MI**.

M-Mode Parameter Menu Selections

Menu Selection	Description
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer in M-mode.
Sweep	Adjusts the scrolling speed of the M-mode sweep.
DR (Dynamic Range)	Adjusts the overall contrast resolution of the M-mode sweep.
Edge (Edge Enhancement)	Distinguishes the contours of a structure during real-time imaging.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels.
Tint	Changes the color of the image.

Color Parameter Menu Selections

Menu Selection	Description
PRF	Adjusts the scale factor of the Pulsed Repetition Frequency (PRF).
Flow	Optimizes for velocity and resistance hemodynamic flow conditions.
Invert	Switches the colors depicting forward and reverse flow in the Color ROI and the color bar.
Priority (Tissue Reject)	Adjusts the threshold for choosing to display Color or 2D-mode data for any pixel.
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer during Color.
Filter (Wall Filter)	Activates and deactivates the adaptive wall filter.
R/S	Adjusts the balance between the image line density (resolution) and the frame rate. Increasing the line density increases resolution and decreases frame rate.
Baseline	Adjusts the relative baseline position upward and downward. A shift in the baseline adjusts the range of displayed flow velocities without changing the system PRF.
Persist (Persistence)	Determines how long the colors corresponding to blood flow velocity remain in the Color ROI before decaying or being replaced by another color.
Smooth (Smoothing)	Adjusts the level of spatial (both axial and lateral) averaging used to smooth the flow pattern display.
Maps	Selects a processing curve that assigns the velocity range to a range of colors.
Display (Display Color)	Activates and deactivates the Color information in the ROI. The default setting is to display Color.

Power Parameter Menu Selections

Menu Selection	Description
PRF	Adjusts the scale factor of the Pulsed Repetition Frequency (PRF).
Flow	Optimizes for velocity and resistance hemodynamic flow conditions.
Backgrd (Background)	Activates a background enhancement of solid color. The solid background color changes, depending on the power map selected.
Priority (Tissue Reject)	Adjusts the threshold for the amplitude of the Power display.
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer during Power mode.
Filter (Wall Filter)	Balances low flow sensitivity with flash suppression.
R/S	Adjusts the balance between the image line density (resolution) and the frame rate. Increasing the line density increases resolution and decreases frame rate.
Persist (Persistence)	Adjusts the time over which power data are processed in calculating the power amplitude display.
Smooth (Smoothing)	Adjusts the level of spatial (both axial and lateral) averaging used to smooth the flow pattern display.
Maps	Selects a processing curve that assigns flow amplitudes to color levels.
Display (Display Power)	Activates and deactivates the Power information in the ROI. The default setting is to display Power.

Doppler Parameter Menu Selections

Menu Selection	Description
PRF	Adjusts the scale factor of the Pulsed Repetition Frequency (PRF).
Baseline	Shifts the spectral baseline position.
Invert	During pulsed wave, Doppler flips the Doppler spectrum vertically on the baseline and inverts the Doppler audio.
60/0/60 (Coarse Angle Correct)	Selects a sixty-degree or zero-degree Doppler angle for use by the system to calculate velocity.
Ang (Angle Correct)	Identifies the Doppler angle used by the system to calculate velocity and is an indicator to aid in obtaining an optimal Doppler angle. Adjusts the Doppler angle in degree increments.
Transmit Frequency	Changes the transmit frequency of an active multi-frequency transducer during Doppler.
Filter (Wall Filter)	Rejects low frequency signals, for example, signals generally caused by tissue clutter.
Gate (Gate Size)	Adjusts the size of the Doppler gate.
Sweep	Adjusts the horizontal speed of the Doppler spectrum.
Steer Rev. (Steer Reverse)	Reverses the Doppler angle, gate axis, and Doppler spectrum.
DR (Dynamic Range)	Controls the overall contrast resolution of the image.
Maps	Allows changes to the shape of the current map.
Tint	Changes the color of the spectrum.
T/F Res (Time/Frequency Resolution)	Adjusts Time/Frequency resolution.

Drop-Down Menus and Group Boxes

In addition to the Parameter menu, the **Image** task card contains imaging selections in a drop-down menu or a group box.

Transducer Drop-Down Menu

Allows you to activate a transducer different from the one activated during completion of the **Patient Registration** form.

Exam Type Drop-Down Menu

Allows you to select a configuration of imaging presets by exam type for image optimization. The system uses the study type selected in the **Patient Registration** form for patient records.

Instructions for Use

Selecting a Study Type Ch 5
Connecting a Transducer Ch 4

Imaging Group Box

Allows you to select a screen format for 2D imaging, for example, a dual format or the optional SieScape™ Panoramic Imaging format. Also contains selections for horizontally or vertically rotating an image.

During 2D-mode, the Imaging group box also includes the Biopsy angle selections, which activates on-screen guidelines for use with the Biopsy function. You must select the on-screen angle that corresponds to the angle of the needle guide attached to a transducer.

System Reference

IMAGE:	
TEQ Technology	Ch 2
Biopsy	Ch 6
ECG function	Ch 7
REVIEW:	
On-screen VCR controls	Ch 1

2D-Mode Image Formats

Icon	Format	Description
	2D	Displays 2D format options.
	SieScape	Displays selections for the SieScape Panoramic Imaging option.
	3-Scape	Displays selections for the 3-Scape™ Imaging option.
	Linear	Linear transducer format for linear transducers.
	Sector	Sector transducer format for linear transducers.
	L/R	**L/R Flip** – Changes the scan direction of the active transducer. The image can be acquired from right-to-left or left-to-right.
	U/D	**U/D Flip** – Changes the scan direction of the active transducer. The image can be acquired from right-to-left or left-to-right.
	Full	Full screen 2D image.
	Dual	2D+2D (if **Seamless Dual** is **OFF** in system presets).
	Seamless Dual	2D+2D with no separation (if **Seamless Dual** is **ON** in system presets).
	Tissue Equalization Refresh	Automatically optimizes the overall FOV image brightness uniformity. This button is available only when a function other than Tissue Equalization™ technology (TEQ) is assigned to the **UPDATE VIEW** key (for example, during mixed 2D/Doppler imaging or with dual-format images).

Doppler

During Doppler, the group box contains drop-down menus for determining the Update style of your 2D image and Doppler spectrum.

To enable the refresh format or change the refresh interval:

- Select the refresh interval setting from the Update menu in the **Imaging** group box.

  During update, the system pauses the Doppler spectrum and refreshes the 2D-mode image according to the interval defined using the Update menu selections. Available settings are:

  - **2D-Lv/D-Lv**
  - **2D-Lv/D-Frz**
  - **D-Lv/2D-Frz**
  - **D-Lv/2D-Lv**
  - **2D-Lv/2D-EOS** (end of sweep)
  - **2D-Lv/2D-2S** (every two seconds)
  - **2D-Lv/2D-4S** (every four seconds)
  - **2D-Lv/2D-8S** (every eight seconds)

To toggle frozen and real-time images:

- Press the **UPDATE VIEW** key.

To enable a simultaneous format:

- Select **2D-Lv/D-Lv** or **D-Lv/2D-Lv** from the Update menu in the **Imaging** group box.

  Both the 2D-mode image and the Doppler spectrum display simultaneously in real-time.

SieScape Imaging

When the option is installed on your system, the Imaging group box contains selections and a speed indicator for use in acquisition of a SieScape image.

System Reference

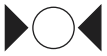
IMAGE:
SieScape Imaging Ch 8

Control Layout

Selection		Description
	Start	Begins acquisition of the composite image.
	Pause	Pauses image acquisition without exiting the Acquire process.
	Stop	Ends image acquisition.

Speed Indicator

The speed of scanning is depicted by the shading of the Speed Indicator.

Shading	Scan Speed
	Below optimum scan rate – increase scan speed slightly.
	Optimum scan rate.
	Above optimum scan rate, nearing "tear" speed – decrease scan speed slightly.

3-Scape Imaging

When the option is installed on your system, the Imaging group box contains selections for use in acquisition of a 3-Scape volume.

Icon	Selection	Description
3D	3-Scape	Activates 3-Scape imaging and displays the 3-Scape acquisition controls.
---	Scan Method	Selects the scan method for volume acquisition.
---	Scan Length/Angle	Selects the scan length or scan angle for volume acquisition.
---	Scan Speed	Selects the scan speed for volume acquisition.
	3-Scape Region of Interest (ROI)	Activates display of the 3-Scape ROI.

Physio Group Box

When the option is installed on your system, the group box provides ECG selections.

Physio ▪ Control Layout

Selection		Description
On	(**On**/Off)	Removes the physio trace from the screen or reactivates it.
	(Decrease **Gain**)	Decreases the wave amplitude of the trace.
	(Increase **Gain**)	Increases the wave amplitude of the trace.
	(**Position** Down)	Adjusts the trace downwards.
	(**Position** Up)	Adjusts the trace upwards.

VCR Group Box

When the option is installed on your system, the group box allows you to control the VCR directly from the **Image** task card.

VCR ▪ Control Layout

Selection		Description
	Record	Start recording active screen to videotape
	Pause	Pause recording active screen to videotape
	Pause or Record	Resume recording after a pause
	Stop	Stop recording
	Forward Search	View the videotape while searching forward
	Reverse Search	View the tape while searching backward
	Rewind	Rewind videotape without viewing (fastest rewind method)
	Forward	Forward videotape without viewing (fastest forward method)
	Blank Search	Locate the next unrecorded section on the videotape
	Reset Counter	To reset the counter
	Play	Begin playing the videotape
	Pause	Pause playing the videotape
	Pause or Play	Resume playing the videotape
	Stop	Stop playing a videotape
	Eject	Eject a videotape from the VCR

CINE Graphics

During CINE playback, a ***CINE bar*** displays on-screen below the image. This CINE bar represents the status of the CINE memory buffer and contains the following elements:

1 **Left CINE marker** – Indicates the beginning of the CINE data. This marker can be repositioned to edit the length of the CINE data.

2 **Frame Counter** – Indicates the number of the active frame.

3 **Rate Indicator** – Indicates the rate of CINE playback. It can be set to 1, 2, 4, 1/8, 1/4, 1/3, 1/2, 2/3.

4 **Right CINE marker** – Indicates the end of the CINE data. This marker can be repositioned to edit the length of the CINE data.

5 **Frame Indicator** – Indicates the location of the frame within the loop of CINE data. It also indicates the direction the CINE data is moving for backward and forward review, and can be scrolled one frame at a time or continuously.

Calcs Task Card

The **Calcs** task card is used during the Measurement function for making measurements and calculations. When activated, group boxes for **Measurements**, **Labels**, and **Picto** (Pictograms) display on the left side of the screen, including menus for measurement tools, measurement labels, and pictograms.

When the trackball cursor is positioned over a group box, it displays as a pointer. When the trackball cursor is positioned over the image area, it displays as a caliper. When you make a measurement, the values display on the bottom of the screen.

To activate the **Calcs** task card, press the **FREEZE** key (when defined in system presets), or use the trackball/**SELECT** key combination to select the **Calcs** task card tab.

Basic System 2

Basic Measurement Tools ▪ 2D-Mode

Tool Icon	2D-Mode Measurements
	Distance
	Ellipse
	Trace

Basic Measurement Tools ▪ M-Mode

Tool Icon	M-Mode Measurements
	Distance
	Heart Rate
	Slope
	Time

Basic Measurement Tools ▪ Doppler

Tool Icon	Doppler Measurements
	Velocity/Frequency
	Heart Rate
	Trace
	RI-S/D (Resistive Index—Systolic/Diastolic)
	Slope
	Heart Cycle
	Velocity Ratio
	Time
	Auto Statistics (located in the **Imaging** group box on the **Image** task card)

Review Task Card

The **Review** task card allows you to review images stored during the current examination. You can also review stored and printed images from previous examinations.

All of the stored images are visible and can be deleted, flagged for attention, and printed. You can apply these changes to each page one by one, or by accessing the specific page of interest. To activate the **Review** task card, select the **Review** task card tab.

The system displays all images stored for the current study on the **Review** task card, including images stored and printed during previous examinations that are in the study folder.

System Reference

PATIENT DATA:
Restarting a completed study Ch 1

The patient name and patient ID for the currently displayed images are always displayed at the top of the screen. During an examination (when a patient is registered), the system also displays the current date and time at the top of the screen. During a review session (when reviewing previous examination[s]), the system displays the study date and time instead of the current date and time.

Display Menu

Selection	Description
Page # of #	Selects a page of images.
Format: #:1	Selects a display format. The selected number represents the number of images per page. Available formats: **1:1**, **2:1**, **4:1**, and **9:1**. **Note:** To toggle full-screen display format with the last selected display format, position the cursor over an image and then press the **UPDATE VIEW** key twice in quick succession.
Text	Displays or hides the image text (such as patient name and imaging parameters) for images saved as ultrasound images with overlays.

Image Selection Tools

Icon	Tool	Function
	Single Select	When a new image is selected, any previously selected image is deselected.
	Multiple Select	When a new image is selected, any previously selected image remains selected.
	Select All	Select all available images.
	Select None	Deselect any selected images.

Image Management Tools

Icon	Tool	Description
	Copy to Film Sheet	Copies the selected image(s) to the **Filming** screen for printing. A counter next to the icon indicates the number of images copied to the **Filming** screen.
	Delete	Activates or deactivates a deletion mark. The deletion mark displays at the top of the selected image(s) to indicate that the image(s) are tagged for deletion. The system deletes the tagged image(s) from the patient study when you end the examination (or end the review session). A counter next to the icon indicates the number of images that are tagged for deletion.
	Flag	Activates or deactivates a flag mark. The flag mark displays at the top of the selected image(s). The flag marker is visible every time you review the image in the **Review** task card. A counter next to the icon indicates the number of images that are marked with a flag.
---	**Selected**	Indicates the number of currently selected images.
---	**Images**	Indicates the number of images displayed on the **Review** task card (all pages).

Buttons

Button	Description
End Exam	Ends the current examination. The system displays this button during an examination, when a patient is registered.
Exit Review	Ends the review session. The system displays this button during review of previous examination(s).

Compose Task Card

The **Compose** task card allows you to edit data acquired with system feature options. It provides tools for manipulating or rotating the images/volumes. When using SieScape or 3-Scape, the ultrasound system will default to the **Compose** task card when acquisition is completed. To perform measurements or to review images, select the **Calcs** or **Review** task cards.

SieScape Parameter Menu Selections (Option)

Menu Selection	Description
Resize Fit (Resize Image)	**Full** scales the image to its full acquisition size. **1**, **2**, **3**, **4**, and **5** incrementally scale the image between **Best Fit** and **Full**.
Redisplay	Redisplay the SieScape image in the size and rotation selected prior to entering CINE.
Restore	Scales the SieScape image to the original display of the frozen image.
Best Fit	Automatically scales the image to fit the image area.
DR (Dynamic Range)	Controls the overall contrast resolution of the image.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels.

Color SieScape Parameter Menu Selections (Option)

The selections are available during the Setup and Acquire processes. Use these selections to optimize and acquire a Color SieScape image.

Menu Selection	Description
AllPwr	Activates or deactivates the Power display in the ROI. When **On**, Power data is visible in the real-time image. When **Off**, Power data is captured and displays in the SieScape image.
Color Cap	Enables continuous capture of Power data without transducer movement. Adds the Power component even when there is insufficient motion for acquiring a black and white SieScape image.
Flow	Activates or deactivates Power mode without stopping image acquisition.
AcqFrac	Adds either 100 percent of the Power ROI data (**On**) or 30 percent of the Power ROI data (**Off**) to the SieScape image during SieScape image acquisition.

3-Scape Parameter Menu Selections (Option)

The 3-Scape Parameter menu includes general selections and mode-specific selections. General selections apply to the entire 3-Scape data set while mode-specific selections apply to data of the specified mode only.

To display or change settings for 3-Scape data of a specific mode (2D-mode or Power mode):

- Select the priority mode indicator on the 3-Scape Parameter menu.

General Selections for 3-Scape Imaging

Menu Selection	Description
Quadrant	Selects (activates) a quadrant: **A**, **B**, **C**, or **D**.
Rendering Method	Selects a display method for the volume quadrant: ▪ **Slice** – Displays a one-voxel-thick slice in its three-dimensional context. The displayed slice (within the volume) corresponds to the most recently selected slice (Multi-Planar Reformatting, or MPR) quadrant. ▪ **Opaque** – Displays the outer surface only. ▪ **Surface Opacity** – Smoothes image contours, creating a soft, sculptured appearance for highlighting surface features. Uses the mode-specific selections for opacity percentage and thresholds. ▪ **Surface Shading** – Heightens contrast, creating a textured appearance for highlighting internal features. Uses the mode-specific selected shading in addition to the mode-specific selected opacity percentage and thresholds.
Display	Limits display to the selected set of data: 2D-mode data and/or Power mode data. **2D** or **2D + C** is available for any selected quadrant. **C** is available for the volume quadrant when the selected rendering method is **Surface Opacity** or **Surface Shading**. **Note:** This selection is available only when the volume includes acquired Power data.
Format	Toggles full-screen display of selected quadrant (**1:1**) with display of all quadrants (**4:1**).
Wireframe	Enables or disables the display of the wireframe in the volume quadrant.
Reset	Adjusts the orientation of quadrants: ▪ **Center** – On each slice, repositions the focal point to the center of the quadrant. ▪ **Sync** – Aligns slice and volume orientations. When the selected quadrant is a slice, aligns the orientation of the volume quadrant to that of the slice quadrant. When the selected quadrant is the volume quadrant, aligns the orientation of all slice quadrants to that of the volume quadrant. ▪ **Reset Orientation** – Restores the default orientation for all quadrants. ▪ **Reset All** – Restores the default orientation and display format for all quadrants; also restores the default (or user defined) settings of other parameters for all quadrants. User-defined settings are those that were in effect when the current volume was first displayed.

2D-Mode-Specific Selections for 3-Scape Imaging

The system applies opacity and shading settings to the volume quadrant only. The opacity settings (**Low Th**, **High Th**, **Opacity**, and **Bright**) are available for the rendering methods **Surface Opacity** and **Surface Shading** only. **Shading** is available for the rendering method **Surface Shading** only. To adjust opacity and shading settings for the 2D-mode data within the volume quadrant (when the volume also includes Power mode data), first limit the display to 2D-mode data.

Menu Selection	Description
Plane	Enables or disables the cut plane for 2D-mode data in the volume. When enabled, the volume does not display any 2D-mode data beyond the cut plane.
Maps	Selects a processing curve that assigns echo amplitudes to gray levels. Applies the selected curve to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected curve to all slices. If the selected rendering method is **Slice** or **Opaque**, applies the selection to all quadrants.
DR	Controls the overall contrast resolution. Applies the selected resolution to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected resolution to all slices. If the selected rendering method is **Slice** or **Opaque**, applies the selection to all quadrants.
Tint	Applies the selected tint to the selected quadrant. If a slice (MPR) quadrant is selected, applies the tint to all slices. If the selected rendering method is **Slice** or **Opaque**, applies the selection to all quadrants.
Low Th (Low Threshold)	Sets the low threshold for the opacity curve. A narrower range between **Low Th** and **High Th** creates a more saturated image. Selectively eliminates darker gray shades, background noise, and "snow" from the 2D-mode data in the volume by removing voxels with values below the selected low threshold. As you adjust the setting, the system briefly maps green color to the voxels in the slice (MPR) quadrants that have values below the new setting.
High Th (High Threshold)	Sets the high threshold value for the opacity curve. A narrower range between **Low Th** and **High Th** creates a more saturated image. Emphasizes voxels of 2D-mode data that have values above the selected high threshold. As you adjust the setting, the system briefly maps blue color to the voxels in the slice (MPR) quadrants that have values above the new setting.
Opacity	Adjusts the percentage of opacity in the volume to smooth image contours.
Shading	Adjusts the percentage of shading in the volume to heighten contrast.
Bright	Adjusts the percentage of brightness in the 2D-mode data of the volume. An increase in brightness increases the saturation of voxels that have a higher voxel value and increases the brightness of voxels that have a lower voxel value.

Power Mode-Specific Selections for 3-Scape Imaging

The system applies opacity and shading settings to the volume quadrant only. The opacity settings (**Low Th**, **High Th**, **Opacity**, and **Bright**) are available for the rendering methods **Surface Opacity** and **Surface Shading** only. **Shading** is available for the rendering method **Surface Shading** only. To adjust opacity and shading settings for the Power mode data within the volume quadrant, ensure that the display includes Power mode data.

Menu Selection	Description
C Plane	Enables or disables cut plane for Power data in the volume. When enabled, the volume displays no Power data beyond the 2D cut plane.
Maps	Selects a processing curve that assigns flow amplitudes to color levels. Applies the selected map to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected map to all slices. If the selected rendering method is **Slice** or **Opaque**, applies the selection to all quadrants.
Priority	Adjusts the tissue rejection level threshold for the amplitude of the Power display. Applies the selected threshold to the selected quadrant. If a slice (MPR) quadrant is selected, applies the selected level to all slices. If the selected rendering method is **Slice** or **Opaque**, applies the selection to all quadrants.
Low Th	Sets the low threshold for the opacity curve. A narrower range between **Low Th** and **High Th** creates a more saturated image. Selectively eliminates lower amplitude data and background noise from the Power mode data in the volume by removing voxels with values below the selected low threshold. As you adjust the setting, the system briefly maps green color to the voxels in the slice (MPR) quadrants that have values below the new setting.
High Th	Sets the high threshold value for the opacity curve. A narrower range between **Low Th** and **High Th** creates a more saturated image. Emphasizes voxels of Power mode data that have values above the selected high threshold. As you adjust the setting, the system briefly maps blue color to the voxels in the slice (MPR) quadrants that have values above the new setting.
Opacity	Adjusts the overall percentage of opacity in the volume to smooth image contours.
Shading	Adjusts the percentage of shading in the volume to heighten contrast.
Bright	Adjusts the percentage of brightness in the Power mode data of the volume. An increase in brightness increases the saturation of voxels that have a higher voxel value (color data) and increases the brightness of voxels that have a lower voxel value (color data).

3-Scape Editing Group Box (Option)

Use the **Editing** group box to define an area within the volume to be removed. The system removes displayed data only (2D-mode and/or Power mode data).

Note: The system dithers the **Editing Menu** selections and the general selections from the 3-Scape Parameter menu (except **Wireframe**) while the volume is automatically rotating.

Menu Selection	Description	Icon
Polygon	Defines an irregular area from a drawn outline and then removes all the voxels inside or outside of that area.	
Parallel Cut	Selects a plane (layer) within the volume and then removes all the voxels outside the selected plane. **Note:** This selection is available during display of 2D-mode or 2D-mode and Power mode; it is not available when only Power mode data is displayed.	
Niche	Removes all the voxels from the nearest corner of the volume to a selected depth inside the volume. **Note:** This selection is available during display of 2D-mode or 2D-mode and Power mode; it is not available when only Power mode data is displayed.	
Undo Last Edit	Removes the most recent edit. You can repeatedly select **Undo Last Edit** to sequentially remove several previous edits.	---
Undo All Edits	Removes all edits.	---

3-Scape Animation Group Box (Option)

Menu Selection	Description	Icon
Automatic Rotation	Automatically rotates the volume according to the selected range, speed, and axis. **Note:** The system dithers the **Editing Menu** selections and the general selections from the 3-Scape Parameter menu (except **Wireframe**) while the volume is automatically rotating.	
Rotation Range	Selects rotation range (in degrees): **30**, **60**, **90**, **120**, **180**, **240**, **300**, **360**. For the **360** selection, the volume continuously rotates in one direction around the selected axis (for **Axial**, to the right; for **Lateral**, downward). For other selections, the volume rotates in both directions around the selected axis (for **Axial**, first right, then left; for **Lateral**, first downward, then upward).	---
Rotation Speed	Selects rotation speed: **Slow**, **Medium**, or **Fast**.	---
Rotation Axis	Selects rotation axis: **Axial** or **Lateral**.	---

Filming Screen

The **Filming** screen allows you to preview images before printing, customize print settings for images, and print images. The **Filming** screen has selections for displaying the next or previous page, setting the number of copies to be printed, managing film jobs and images, and selecting layout, text, graphics, size, and printer-related settings.

Images printed from the current examination are available for preview and printing from the **Filming** screen when automatic printing is disabled. Use the system presets to disable automatic printing.

Print/Store

You can copy stored images to the **Filming** screen from the current examination or from previous examinations.

System Reference

PATIENT DATA:
Copying Images to the Filming Screen Ch 1

Images are displayed in the **Filming** screen on separate sheets (pages). The current sheet number and the total number of sheets display next to the page corner icon.

Selection		Description
	page corner icon	Displays the next or previous page.
	Copies (text box)	Sets the number of copies of the selected film job for printing.

Filming Screen Tools

Icon	Tool	Function
	Film Task Status	Displays film job information.
	Delete	Deletes the selected image(s) or the selected film job from the **Filming** screen.
	Expose Film Task	Immediately sends all images in the film job to the selected printer.

Filming Screen Tab Card

The tab card on the **Filming** screen has three tabs where you can prepare images for printing:

Layout Select a layout for your printed images.

Images Control image display.

Camera Override the system presets for printer selection.

Layout Tab

Select from a choice of pre-configured layouts for your printed images on the **Layout** tab. The more images you choose per film sheet, the smaller your images will print.

Images Tab

Image text tools affect the display of patient name and imaging parameters while graphic tools affect the display of regions of interest (ROIs) and color bars. Use the system presets to customize image text (designate categories of image text for display).

Note: Image text and graphics can be hidden and displayed on images that were saved as ultrasound images with graphic overlays only.

Basic System

System Reference

PATIENT DATA:
Choosing the Output Format for Images Ch 1

Icon	Tool	Function
	All Text	Displays image text for the selected image(s).
	Customized Text	Displays customized image text for the selected image(s).
	No Text	Hides image text for the selected image(s).
	Show Graphics	Displays graphics for the selected image(s).
	Hide Graphics	Hides graphics for the selected image(s).
	Fit to Segment	Displays the selected image(s) as large as possible (without clipping) given the size of their segment(s).
	Original Image	Do not change the image display format from the factory default **Fit to Segment** (the only valid setting). Changing this selection from the factory default may cause errors during printing.
	Clip Document	Do not change the image display format from the factory default **Fit to Segment** (the only valid setting). Changing this selection from the factory default may cause errors during printing.

Camera Tab

You can override the default printer selected in system presets by selecting from available printers on the **Camera** tab. You can also select film size.

Filming Shortcut Menus

The Filming screen displays a shortcut menu when you press the **NEXT** key on the control panel. The shortcut menu displayed depends on the location of the trackball pointer.

Shortcut Menu Displayed	Location of the Trackball Pointer
Film Job Management Selections	Outside the gray border of the image page.
Image Management Selections	Inside of the gray border of the image page, after image selection.

Film Job Management Selections

Selection	Function
Expose Film Sheet	Immediately sends the images on the selected film sheet to the selected printer.
Repack	Reorganizes all images in the current film job or the selected film sheet (page) to fill all empty positions, if any exist. Example: The film job has two pages with five images. The layout is 4:1 (four images per page). An image is deleted from the lower right of the first page (film sheet), resulting in an empty position. **Repack** reorganizes all images in the film job, placing the image from the second page onto the first page and deleting the second page. **Note:** This selection is not available when image(s) are selected.
Expose Film Job	Immediately sends all images in the film job to the selected printer.
Properties...	Displays the **Film Properties** dialog box.

Image Management Selections

Selection	Function
Cut	Removes the selected image(s) from the film job and places the image(s) onto the clipboard.
Copy	Places the image(s) onto the clipboard.
Paste	Copies the image(s) from the clipboard onto the selected position of the film sheet.
Select Series	Selects all images of the series object that contains the selected image. For example, if the selected image is the second image in a four-image series object, then the system selects all four images in the series object.
Select On Succeeding	Selects images of the series object that contains the selected image, starting with the selected image and ending with the last image in the series object. For example, if the selected image is the second image in a four-image series object, then the system selects the second, third, and fourth images only.
Clear Document(s)	Removes the selected image(s) from the film job.
Properties…	Displays the **Film Properties** dialog box.

Patient Browser Screen

The patient browser displays patient data stored on the following storage locations: local database, the connected HIS/RIS server (if any), and the inserted compact disk (CD). Elements of the patient browser include the menus, the toolbar, the navigation section, the content section, and the information section. The information section is displayed for Tree View layout only; display of the toolbar and the information section can be enabled or disabled.

Within the navigation and content sections, the system displays the storage locations, the patient data, the status indicators, and the information about the selected patient data. Status indicators denote occurrences of printing, transferring, and other actions for the selected patient data. Information about the patient data (such as referring physician or study type) is displayed according to the pre-selected headings. Use the **Browser Configuration** window to configure display of status indicators and headings.

The organization of the patient data within the navigation section and/or the content section depends on the selected layout (Tree View or Single View). The Tree View layout is the default setting.

Instructions for Use

Patient browser menu selections and toolbar buttons 3-62

System Reference

PATIENT DATA: Browser Configuration window Ch 1

Icon Selections

The following icons are displayed in the navigation section of the patient browser.

Icon	Selection	Description
	Local Database (storage location)	Displays patient data stored on the local database.
	Scheduler (storage location)	Displays pre-registered patients (data entered on the ultrasound system) and scheduled patients (data retrieved from a connected HIS/RIS server).
	CD-R_READ (storage location)	Displays patient data stored on the inserted CD.
	Patient folder (Local Database or CD-R_READ)	Displays study folders within the patient folder. This icon is displayed in Tree View only, for patient data on **Local Database** or **CD-R_READ**.
	Study folder	Displays series objects within the study folder. This icon is displayed in Tree View only, for patient data on **Local Database** or **CD-R_READ**.
	Series object	Displays images within the series object. This icon is displayed in Tree View only, for patient data on **Local Database** or **CD-R_READ**.
	Patient folder (Scheduler)	Displays procedure folders within the patient folder. This icon is displayed in Tree View only, for patient data on **Scheduler**.
	Procedure folder	Displays procedure steps within the procedure folder. This icon is displayed in Tree View only, for patient data on **Scheduler**.
	Procedure step	Displays action items within the procedure step. This icon is displayed in Tree View only, for patient data on **Scheduler**.

Menu Selections

The system displays the toolbar if enabled. When the toolbar is enabled, the system displays the toolbar buttons that are configured for display. Use the **Browser Configuration** window to configure display of toolbar buttons.

System Reference

PATIENT DATA:
Displaying the toolbar Ch 1
Browser Configuration window Ch 1

Patient Menu Selections

Menu Selection	Description	Toolbar Button
Register…	Displays the **Patient Registration** form. If a patient folder or study folder was selected, copies the patient data to the **Patient Registration** form.	
Load To Review	Exits the patient browser and displays the images of the selected study folder or series object in the **Review** task card. This selection is available for patient data on the **Local Database** only.	
Show MPPS	Displays the **Modality Performed Procedure Step** dialog box, which lists MPPS data for the selected study. This selection is available for patient data stored on the **Local Database** only. **Note:** When you select a patient folder, the system automatically selects the most recent study folder; when you select **Local Database**, the system automatically selects the first patient folder.	
Film Task Status…	Displays the **Film Task Status** dialog box, which lists film jobs.	
Expose Film Task	If a film job exists in the **Filming** screen, then the system immediately sends all of its images to the default printer. If more than one film job exists in the **Filming** screen, then the system displays the **Select Film Job** dialog box, which lists film jobs you can select for printing.	
Copy to Film Sheet	Copies the selected images to the **Filming** screen for manual formatting and exposure. If you select a patient folder, the system copies all images for all study folders within the selected patient folder. This selection is available for patient data on the **Local Database** only.	

Menu Selection	Description	Toolbar Button
Print Preview	Displays a preview of the patient data for printing. This selection is available for a selected storage location, patient folder, or procedure (**Scheduler**) only.	---
Print List	Prints the patient data displayed in the content section of the patient browser.	---
Print…	Displays the **Print** dialog box, listing available printers and their configuration options.	---
Close Browser	Exits the patient browser.	---

Transfer Menu Selections

Menu Selection	Description	Toolbar Button
Import	Copies the selected patient data to the **Local Database**. This selection is available for patient data on the CD only.	
Archive to "__"	Archives the selected patient data to the indicated archive device. This menu selection indicates the currently configured default archive device. For example, if the CD-R is the default archive device, then the menu selection is **Archive to CD-R**.	
Archive to…	Displays the **Archive To** dialog box, which lists destinations (archive devices) for archival of the selected patient data. When the archival is complete, the system updates the work status of the patient data to "Archived". This selection is available for patient data on the **Local Database** only.	
Send to "__"	Sends the selected patient data to the indicated storage device. This menu selection indicates the currently configured default storage device. For example, if a workstation named "MV300" is the default storage device, then the menu selection is **Send to MV300**.	
Send to…	Displays the **Send To** dialog box, which lists destinations (storage devices) for storing of the selected patient data. When the transfer is complete, the system updates the work status of the patient data to "Sent". This selection is available for patient data on the **Local Database** only.	

Menu Selection	Description	Toolbar Button
Export to…	Displays the **Export To** dialog box, which lists destinations (offline devices) for storing of the selected patient data. When the transfer is complete, the system updates the work status of the patient data to "Exported". This selection is available for patient data on the **Local Database** only.	----
Eject from CD-R	Ejects the CD.	
Eject from…	Displays the **Eject From** dialog box. The system ejects the CD when you select the CD and confirm the operation.	----
Local Job Status…	Displays the **Local Job Status** dialog box, which lists transfers of patient data to the inserted CD or to other local destinations.	
Network Job Status…	Displays the **Network Job Status** dialog box, which lists transfers of patient data to the network.	
Import from Off-line…	Displays the **Import from Off-line** dialog box, which lists paths on the system's hard disk and the patient data files stored there. The system imports the selected patient data files to the **Local Database**. **Note:** You can also enter a path and press the **Enter** key on the keyboard to cause the system to display contents of your entered path. A path is a hierarchical description of the location of the file. For example, "c:\temp" is the path to a file located in the temp directory on the system's hard disk.	----
Export to Off-line…	Displays the **Export to Off-line** dialog box, which lists paths on the system's hard disk and export options for export of the selected patient data. The system exports the selected patient data files to the selected path on the system's hard disk. This selection is available for patient data on the **Local Database** only. **Note:** You can also enter a path. A path is a hierarchical description of the location of the file. For example, "c:\temp" is the path to a file located in the temp directory on the system's hard disk.	----

Edit Menu Selections

Menu Selection	Description	Toolbar Button
Cut	Places a copy of the selected item of patient data onto the clipboard for future removal.	
Delete	Removes the selected patient data from a storage location.	
Paste	Rearranges the patient data present in the clipboard (that is, the item of patient data that was most recently "copied" using the **Cut** selection) by removing it from its original location and inserting it into the selected item of patient data.	
Update Worklist	For systems connected to a HIS/RIS server, manually updates the **Scheduler** display of data for scheduled patients by sending (invoking) a HIS/RIS query.	
Protect	Assigns protection to the selected patient data. Protection on any objects in the lower or higher data levels prevents deletion. For example, protection assigned to a series object prevents deletion of the related patient folder. However, an unprotected, unrelated series object within this same patient folder can be deleted.	
Remove Protection	Removes protection from the selected patient data.	
Mark	Assigns "mark" (bookmark) work status to the selected patient data. Marked items of patient data can be filtered for display.	
Unmark	Removes "mark" work status from the selected patient data.	
Set State►	Indicates completion of the selected process. **Note:** This selection is not available for patient data on **Scheduler**.	
Completed	Indicates completion of the Completed process for the selected patient data.	
Read	Indicates completion of the Read process for the selected patient data.	
Verified	Indicates completion of the Verified process for the selected patient data.	
Correct	Displays the **Correct** dialog box, which lists information about the selected patient data. The system applies any entered corrections (such as a revised study comment) to the selected patient data.	
History	Displays the **Correct & Rearrange History** dialog box, listing information about past corrections.	

View Menu Selections

Menu Selection	Description	Toolbar Button
Open Subtree	Displays all series objects for the selected patient folder. A series object may contain multiple images.	
Close Subtree	Hides all series objects for the selected patient folder.	
Refresh	Manually updates the display of patient data. **Note:** The system automatically updates patient data at regular intervals. **Note:** This selection does not update the **Worklist**.	
Tree	When checked, displays patient data according to the pre-selected format options for Tree View layout. When not checked, displays patient data according to the pre-selected format options for Single View layout. To configure the format options for Tree View or Single View layout, access the **Browser Configuration** dialog box by selecting **Configure Browser…** from the **Options** menu.	
Image Stamps	When checked, displays miniature representations of the images within the selected series object, according to the pre-selected format options for image presentation. When not checked, displays information about the images within the selected series object, according to the pre-selected headings for images. To configure the format options for Tree View or Single View layout, access the **Browser Configuration** dialog box by selecting **Configure Browser…** from the **Options** menu. **Note:** This selection is not available for the Single View display format.	
Toolbar	When checked, displays the pre-selected toolbar buttons. To configure toolbar buttons, access the **Browser Configuration** dialog box by selecting **Configure Browser…** from the **Options** menu.	

Menu Selection	Description	Toolbar Button
Info Area	When checked, displays information above the content section depending on the level of selected patient data: ▪ patient folder – patient name, date of birth, patient ID ▪ study folder – study description and study date, in addition to patient folder information ▪ series object or image – modality, in addition to study folder information	
Source►		
1 Scheduler	When checked, displays the **Scheduler** icon for viewing of pre-registered and scheduled patients.	
2 Local Database	When checked, displays the **Local Database** icon for viewing of patient data stored on the local database.	
3 CD-R_READ	When checked, displays the **CD-R_READ** icon for viewing of patient data stored on an inserted CD.	

Filter Menu Selections

Menu Selection	Description	Toolbar Button
Off	Disables any activated filter and displays all patient data.	
Not Archived	Displays only patient data without an archived work status.	
Not Printed	Displays only patient data without a printed work status.	
Not Sent	Displays only patient data without a sent work status (for sending over the network).	
Not Marked	Displays only patient data without a "marked" work status.	
Marked	Displays only patient data with a "marked" work status.	
(user-defined filter)	Displays only patient data that meets the criteria specified for the selected user-defined filter.	

Sort Menu Selections

The sorting function is available for the Tree View layout.

The **Sort** menu contains different selections depending on the level of patient data selected (storage location, patient folder, study folder, series object, or image).

Note: Sorting is restricted to the list of patients for the **Scheduler**.

When you select an option in the **Sort** menu, the system reorders data in the next lower data level. For example, if you select **Local Database** and then select **Patient Name** from the **Sort** menu, the system displays the patient folders in order by patient name. If you select a patient folder and then select **Study Date and Time** from the **Sort** menu, then the system displays the series objects within the patient folder in order by date and time.

Sort Selections for Storage Location Icons

Selection	Sorts Patient Folders by…
Patient Name	Patient name.
DB Date and Time	Date and time that the patient folder was created on the **Local Database**.
Work Status ▶	
1 Printed	Printed work status. Not available for **Scheduler**.
2 Archived	Archived work status. Not available for **Scheduler**.
3 Sent	Sent work status. Not available for **Scheduler**.
Reverse Order	Reverse order in the selected sorting option above.

Sort Selections for Patient Folders

Selection	Sorts Study Folders by…
Study Description	Study description.
Study Date and Time	Study date and time.
Work Status ▶	
1 Printed	Printed work status.
2 Archived	Archived work status.
3 Sent	Sent work status.
4 Workflow	Workflow work status.
Reverse Order	Reverse order in the selected sorting option above.

Sort Selections for Study Folders

Selection	Sorts Series Objects by…
Series Number	Series number.
Series Description	Series description.
Series Date and Time	Series date and time.
Modality	Modality.
Work Status►	
1 Printed	Printed work status.
2 Archived	Archived work status.
3 Sent	Sent work status.
4 Workflow	Workflow work status.
Reverse Order	Reverse order in the selected sorting option above.

Sort Selections for Series Objects or Images

Selection	Sorts Images by…
Instance Number	Instance (image) number.
Instance Date and Time	Instance (image) date and time.
Slice Position	Slice position (transversal-coronal-sagittal).
Modality Specific Data►	Reserved for future use.
Work Status►	
1 Printed	Printed work status.
2 Archived	Archived work status.
3 Sent	Sent work status.
Multiple…	Displays the **Image Display Order** dialog box, which lists multiple sorting options.
Reverse Order	Reverse order in the selected sorting option above.

Options Menu Selections

Selection	Description
Configure Browser…	Displays the **Browser Configuration** dialog box, which contains options for customizing the display of the patient browser.
Filter Settings…	Displays the **Filter Specification** dialog box, which lists criteria for the selected filter.
Close after Loading	Reserved for future use.

Help Menu Selections

Selection	Description
Contents…	Displays the online help.

4 System Setup

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Initial Setup

The ultrasound imaging system is initially unpacked and installed by a Siemens representative. Your Siemens representative will verify the operation of the system. Any transducers, documentation devices, accessories, and options delivered with your system are also connected and installed for you.

Each day before you use the ultrasound system, perform the Daily Checklist procedures described below.

Daily Checklist

Perform the following each day before using the ultrasound system:

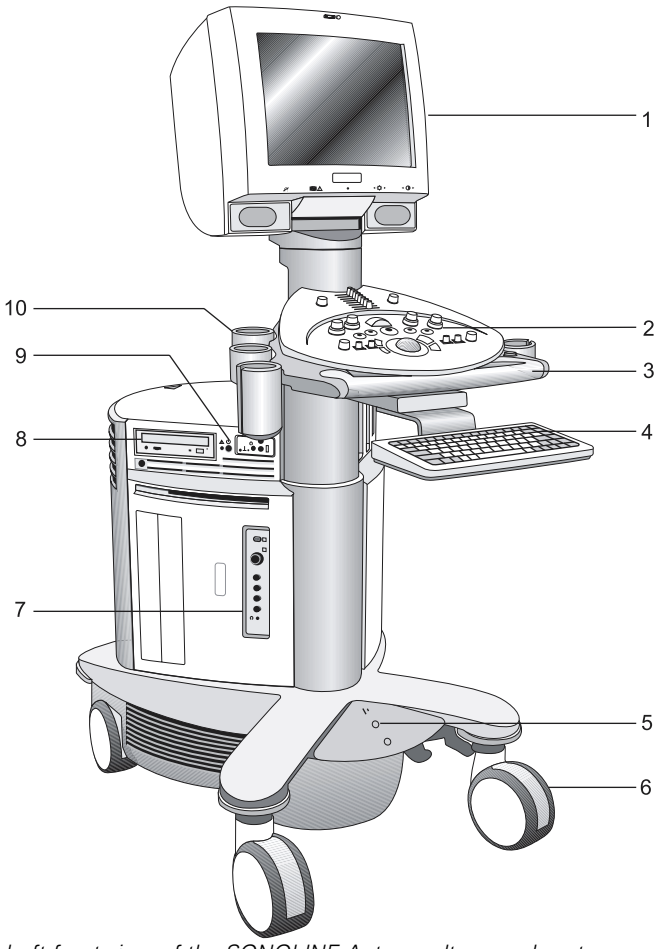
- ❒ Visually inspect all transducers. Do not use a transducer that has a cracked, punctured, or discolored casing or a frayed cable.
- ❒ Visually inspect all power cords. Do not turn on the power if a cord is frayed or split, or shows signs of wear.

  If your system's power cord is frayed or split, or shows signs of wear, contact your Siemens service representative for power cord replacement.
- ❒ Verify that the trackball, and the DGC slider controls are clean and free from gel or contaminants.

Once the system is powered on:

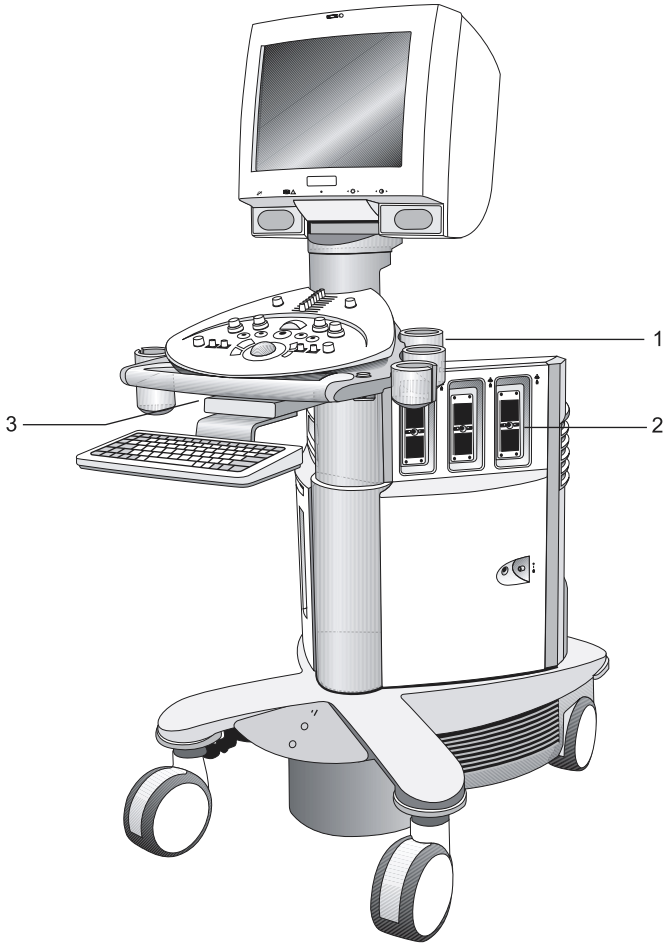
- ❒ Visually check the on-screen displays and lighting.
- ❒ Verify that the monitor displays the current date and time.
- ❒ Verify that the transducer identification and indicated frequency are correct for the active transducer.

System Review



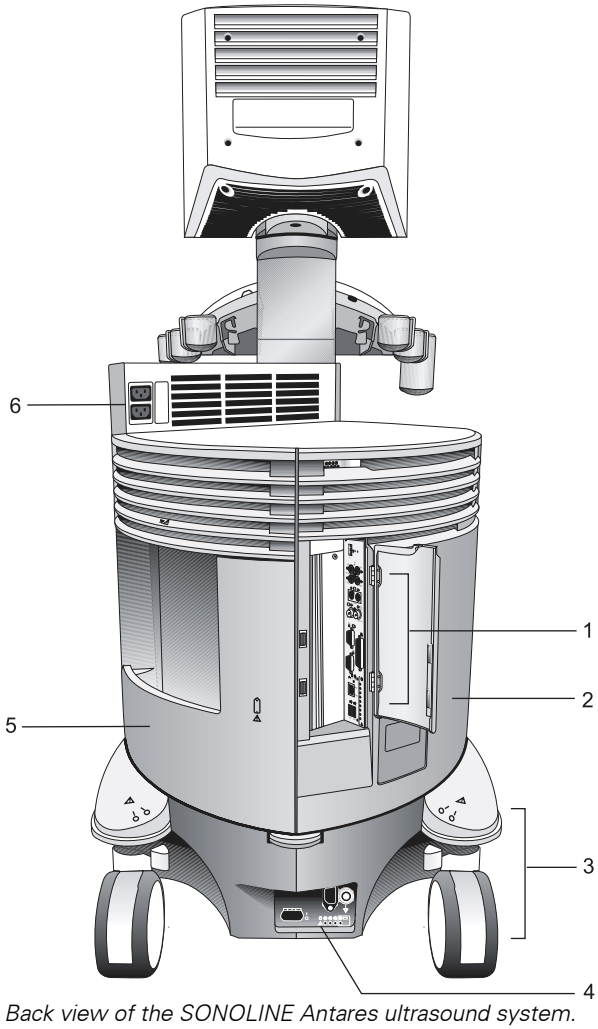
Left-front view of the SONOLINE Antares ultrasound system.

1 User-adjustable monitor with two forward-facing speakers
2 User-adjustable control panel
3 Front handle
4 Language-specific alphanumeric keyboard
5 Central brakes
6 Front swivel wheels
7 Physio panel
8 Recordable compact disk (CD-R) drive
9 Power ON/OFF ⏻ (Standby)
10 Transducer holders



Right-front view of the SONOLINE Antares ultrasound system.

1 Transducer and gel holders
2 Transducer ports
3 Keyboard light (underneath control panel)



Back view of the SONOLINE Antares ultrasound system.

1 Input/output panel with audio and video connections
2 Left-rear panel
3 Rear swivel wheel with brake
4 AC tray panel
5 Right-rear panel with storage bin
6 AC outlets for on-board peripheral devices

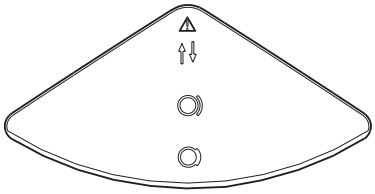
Moving the System

⚠ **Caution:** Preparations before moving the system are important to minimize potential damage to sensitive components and to avoid safety hazards. Review the moving instructions before moving the system.

⚠ **Caution:** Do not park, or leave unattended, on a slope. Even when the rear brakes are engaged, the system may slide down a ramp.

The ultrasound system is designed to be a mobile unit. Before moving the system to another location, you must prepare for the move by powering off and securing the system.

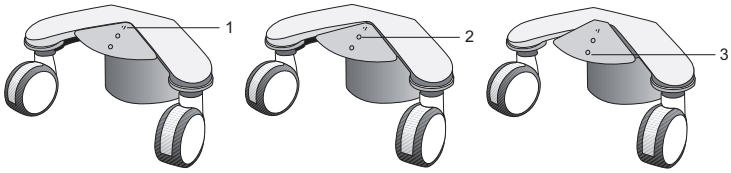
Using the Front Brakes



Front Brake.

The front brakes (on the wheels nearest you when you face the control panel on the ultrasound system) are set differently from the rear brakes.

The front brakes are set simultaneously from a foot pedal in the central section of the system front bumper as either unlocked, locked swivel, or locked.



Positions of the front brake.

1 Locked swivel (wheels only roll straight forward or backwards)
2 Unlocked (wheels can swivel and roll)
3 Locked (wheels cannot swivel or roll)

To set the front brakes:

- Press the center section of the front bumper down firmly with your foot until the brakes lock into place. This is the lowest position for the front bumper.

To release the front brakes:

- Lift the center section of the front bumper from underneath until it clicks once, using the top of your foot. This is the center position for the front bumper.

To set the swivel brakes:

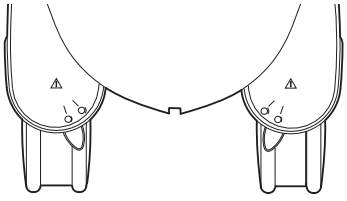
- Lift the center section of the front bumper from underneath firmly until the wheels are locked in a forward position, using the top of your foot. This is the highest position for the front bumper.

To release the swivel brakes:

- Press the center section of the front bumper down with your foot until it clicks once. This is the center position for the front bumper.

Using the Rear Brakes

The rear brakes are set individually as either unlocked or locked.



Rear Brakes.

To set the rear brakes:

- Using your foot, move lever to the Lock position until you hear a click.

To release the rear brakes:

- Using your foot, move lever to the Unlock position until you hear a click.

Prior to the Move

1. **Power OFF:** Briefly press and then release the power on/off switch (⏻) to power off the ultrasound system. The power on/off switch is located to the right of the CD-R drive.
2. **Unplug cord:** Unplug the power cord from the wall outlet. Pull on the plug, NOT the cord.
3. **Secure components:** The following components must be secured or transported separately:
   - Power cord: Secure the power cord to avoid rolling the system wheels over the cord.
   - Transducers: To ensure that the transducers are transported safely, remove each transducer and place it in its protective carrying case.
   - Keyboard: push the keyboard under the control panel.
   - Gel, videotapes, and CD-R disks: transport separately.
4. **Release brakes:** Release both the front and rear brakes.

During the Move

⚠ **Caution:** When moving the ultrasound system, protect it from environmental changes including: moisture, winds, dirt and dust, and extreme heat or cold exposure.

⚠ **Caution:** Avoid moving the ultrasound system on outside surfaces with loose dirt, contaminates, or standing liquids.

⚠ **Caution:** Care should be taken to minimize shock and vibration of the ultrasound system. Avoid uneven surfaces that contain an abrupt height change or jarring surface irregularities.

You can move the ultrasound system from room to room within a facility and easily reposition the system during an examination. Be careful on inclines and uneven surfaces. The ultrasound system can be moved across pavement and other hardened parking lot surfaces.

Note: The wheels of the ultrasound system must be locked when transporting by vehicle. The ultrasound system must be sufficiently anchored to the vehicle floor or walls such that it does not shift or move during transport.

After the Move

⚠ **Caution:** Make sure the ultrasound system has proper ventilation during operation. Do not position the system against walls or hard surfaces that would impede free ventilation around the system.

⚠ **Caution:** Do not allow linens, bedding, and/or hanging curtain partitions to block the ultrasound system's ventilation.

⚠ **Caution:** Obstructed fans can cause potential system overheating, system performance degradation, or failure.

⚠ **Caution:** Brakes are most effective on a level surface. Never park the system on an incline greater than five degrees.

- ❑ Position system: Make sure the system is not placed against walls or fabrics that obstruct perimeter air flow to the system cooling fans.
- ❑ Set brakes: Set the front and rear brakes.
- ❑ Plug in cord: Plug the power cord into a hospital-grade or local equivalent wall outlet.
- ❑ Power ON: Power on (⏻) the ultrasound system.
- ❑ Check display: After the boot-up sequence is complete, verify that the image display is stable, that you can select a transducer, and that selections made on the control panel respond to your selection.

Shipping the System

When shipping the system, perform the following tasks, as appropriate.

To prepare the system for shipment over long distances or rough terrain:

1. Repack the system in the factory packaging and crate according to the instructions shown on the container.
2. Load the system into a vehicle using a lift gate.

   To prevent lateral movement of the system, secure the system with cargo straps.

   To prevent sudden jarring of the system during transport, provide shock cushions beneath the system.

System Startup

The first step to operating the ultrasound system is to connect the system to a power source.

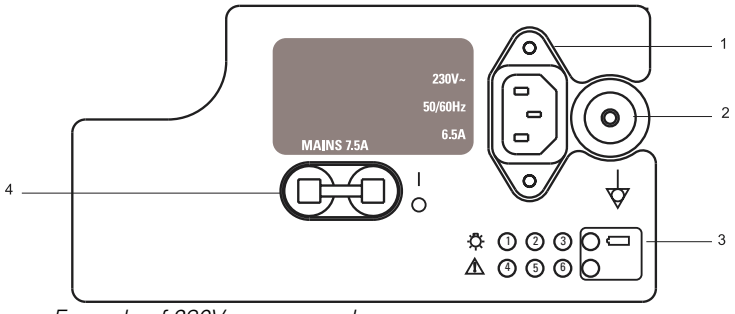
Plugging in the System

The ultrasound system has a non-detachable power cord.

⚠ **WARNING:** For 115V units only: To ensure grounding reliability, connect the system only to a hospital-grade power receptacle.

To plug in the system:

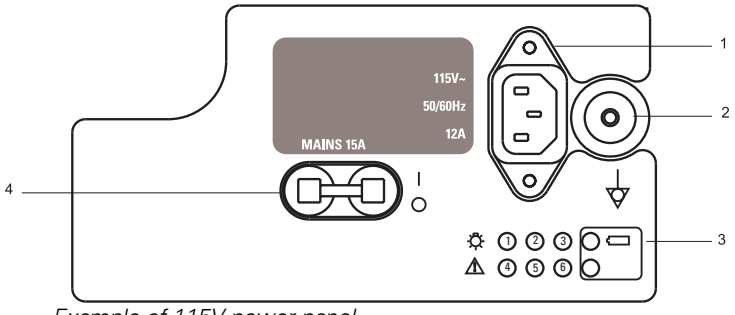
- Connect the power cord plug to the MAINS supply in the following manner:
  - **230V systems** to a 230V standard MAINS, i.e., "Schuko" receptacle (CEE 7-7 standard).



1 Power cord connector
2 Equipotential connector
3 Service diagnostic lights
4 MAINS circuit breaker
I = ON
O = OFF

Example of 230V power panel.

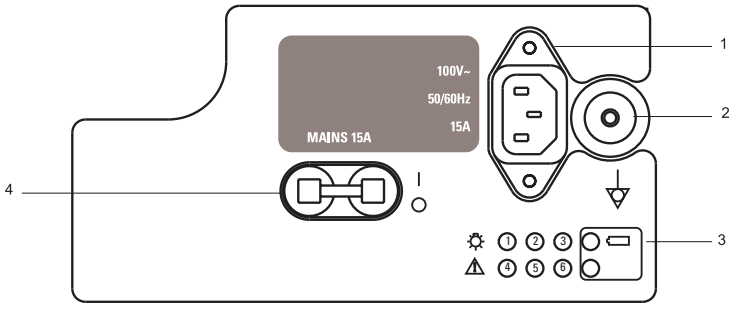
  - **115V systems** to a hospital-grade MAINS receptacle.



1 Power cord connector
2 Equipotential connector
3 Service diagnostic lights
4 MAINS circuit breaker
I = ON
O = OFF

Example of 115V power panel.

– **100V systems** to a standard 100V MAINS receptacle.



Example of 100V power panel.

1 Power cord connector
2 Equipotential connector
3 Service diagnostic lights
4 MAINS circuit breaker
I = ON
O = OFF

Supplying Power to the System

The ultrasound system is powered on and off using the green partial power on/off switch (⏻) located on the front of the system.

Note: This switch does not completely shut down or disconnect the system from the power mains. This switch only powers on, or off, a portion of the ultrasound system. To completely disconnect the system from the power mains, the circuit breaker located on the back panel must be switched from the **I** to **O** position.

⚠ **Caution:** Wait approximately 20 seconds between powering the system off and then on again. This allows the system to complete its shutdown sequence.

To power on the system:

1. Before using the system, perform the Daily Checklist.
2. Verify the power cord is plugged into the system and then into the power supply.
3. Power on (⏻) the ultrasound system.

   Cold-Boot

   When the system is powered on, it runs through a series of self-diagnostic and calibration tests, after which the system is ready for use.

   Note: The system will not run through the complete power-on routine if a problem occurs. Instead, an error code or message appears on the screen to indicate the problem. Please note the message and call your local Siemens service representative.

4. Visually check the on-screen displays and lighting indicated in the Daily Checklist.

Instructions for Use

Daily Checklist 4-3
Location of partial power on/off switch 4-4

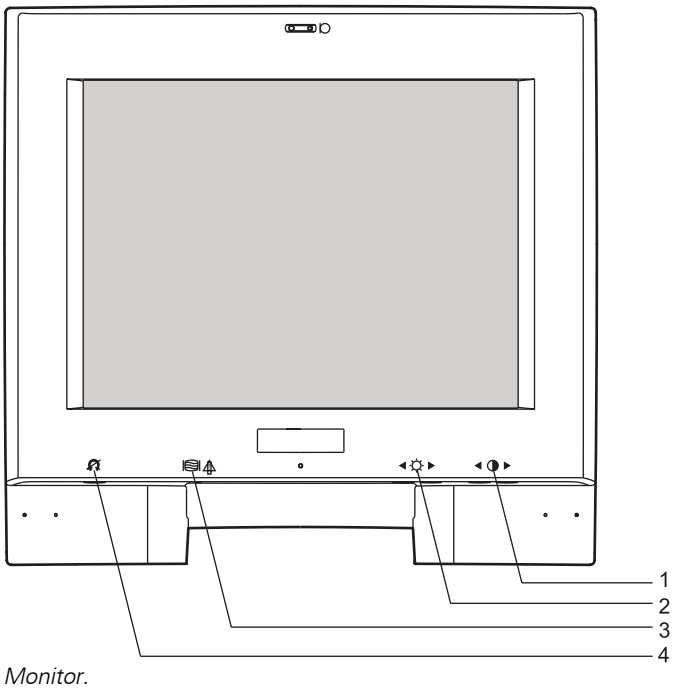
To power off the system:

- Briefly press and then release the power on/off switch (⏻) to power off the ultrasound system.

  If the system is transferring images, then it will wait until the transfer is complete to power off.

  Wait approximately 20 seconds before powering on (⏻) the ultrasound system.

Adjusting Controls on the Monitor



1 Contrast Control
2 Brightness Control
3 Monitor self test
4 Degauss

Monitor.

For consistency in image reproduction, adjustments to the brightness and contrast of the viewing monitor should be made prior to adjusting the print quality of installed documentation devices.

To adjust the brightness or contrast control for the monitor:

- Press the right contrast button to increase the display contrast and the left button to decrease the contrast.
- Press the right brightness button for a brighter image with a lighter background and the left button to darken.

Note: Factory-defined imaging presets were created using default settings of the brightness and contrast controls of the monitor. Adjusting the brightness and contrast controls on the monitor may affect the image optimization intended by the factory-defined imaging presets.

To restore and *lock* the factory default monitor settings for brightness and contrast:

1. Simultaneously press the two Brightness buttons (☼) located on the right front underside of the monitor.

   The system restores the factory default setting of 32% for Brightness.

2. Simultaneously press the two Contrast buttons (◑) located to the right of the Brightness buttons.

   The system restores the factory default setting of 86% for Contrast.

3. Press and hold the Degauss button (⌀) for 15 seconds or until the system displays a notification message. The button is located on the left front underside of the monitor.

   The message notifies you that the 'OSD Main Menu is locked'.

   Note: To unlock the monitor settings, repeat step 3 above.

   This process assures consistent quality in the image display and reduces the potential for image quality issues.

Testing the Monitor

If you suspect monitor-specific problems, you can activate the monitor self test for confirmation. This test displays patterns on the screen. The patterns are separate from the system video. The patterns display in the following order:

- Cross-hatch pattern (#1): seven lines of white consecutive dashes, each alternating with a line of white vertical bars, on a black background.
- Black test pattern (#2): "BLACK" in white letters on a black background.
- White test pattern (#3): "WHITE" in black letters on a white background.
- Color-bar test pattern (#4): four vertical bars, labeled (from left to right) "W" for white, "R" for red, "G" for green, and "B" for blue.

To test the monitor:

1. Press the Monitor self test button located on the underside of the monitor with the tip of a pen or a paper clip.

   The green monitor LED (under the Siemens logo) blinks and the first test pattern in the sequence displays on the screen.

2. Observe the cross-hatch display and note any differences from the correct display described above.

3. Press the Degauss button located on the underside of the monitor to scroll through each test pattern in the sequence. Compare each test pattern with the correct display (described above) and note any differences, such as missing colors or geometric distortions. When you press the Degauss button the fourth time, the monitor self test automatically exits and the green monitor LED (under the Siemens logo) stops blinking.

4. Contact your Siemens service representative if you notice a missing color, geometric distortion, or other incorrect display in any of the patterns.

Instructions for Use

Location of monitor buttons 4-14

Degaussing the Monitor

The color display on the monitor can become distorted from electromagnetic buildup. You can correct these distortions using the Degauss button.

To degauss the monitor:

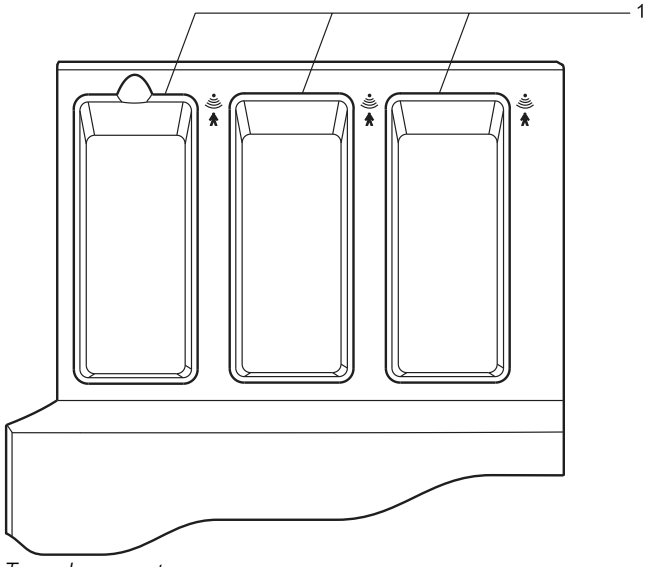
- Press the Degauss button.

  Note: A ten-minute charge time is required before the next activation of the Degauss button.

Connecting and Disconnecting Transducers

⚠ **Caution:** Ensure that the system is in freeze before connecting and disconnecting transducers. If a transducer is disconnected before the image is frozen, the system will display an error message and it will be necessary to reset the system before continuing to use it.

You can connect up to three transducers to the ultrasound system, with one transducer being the ***active*** transducer. The names of the transducers currently connected to the system display on the **Image** task card.



Transducer ports.

1 Three 260-pin ports for array transducers

Level of Protection Against Electrical Shock ▪ System

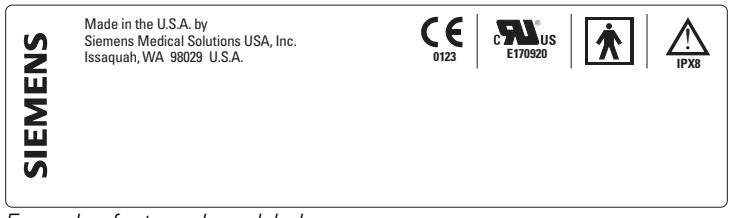
According to EN 60601-1 and IEC 60601-1, the system provides a "Level of Protection Against Electrical Shock" of "Type B."

The Type B icon is located on the system.

Level of Protection Against Electrical Shock ▪ Transducers

According to EN 60601-1 and IEC 60601-1, the assemblies for the endocavity transducer and the linear, curved, and phased array transducers provide a "Level of Protection Against Electrical Shock" of "Type BF."

The Type BF icon is located on the transducer label.



Example of a transducer label.

Array Transducers

Connect an array transducer to any of the three available array ports.

Array transducer port.

⚠ **Caution:** You must freeze the system before connecting or disconnecting a transducer.

Note: When transducer connectors are being attached to or disconnected from the system, resistance may be encountered due to the special shielding material inside the connectors. This is normal for these transducers.

To connect an array transducer:

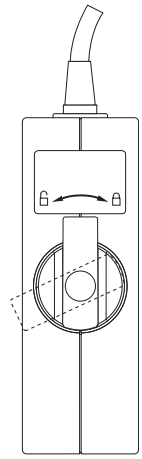
1. Hold the transducer connector with the cable extending upward from the connector.
2. Insert the connector pins into the system port and turn the lock on the transducer connector clockwise until it locks in position.

   This secures the connector in position and ensures the best possible contact.
3. Place the transducer in the transducer holder.

To disconnect an array transducer:

⚠ **Caution:** To avoid damaging the transducer cable, do not pull on the cable to disconnect the transducer. Use the following instructions.

1. Turn the lock on the connector housing counterclockwise until it unlocks.
2. Firmly grasp the transducer connector and carefully remove it from the system port.
3. Store each transducer in its protective carrying case.



Locked and unlocked positions of the connector.

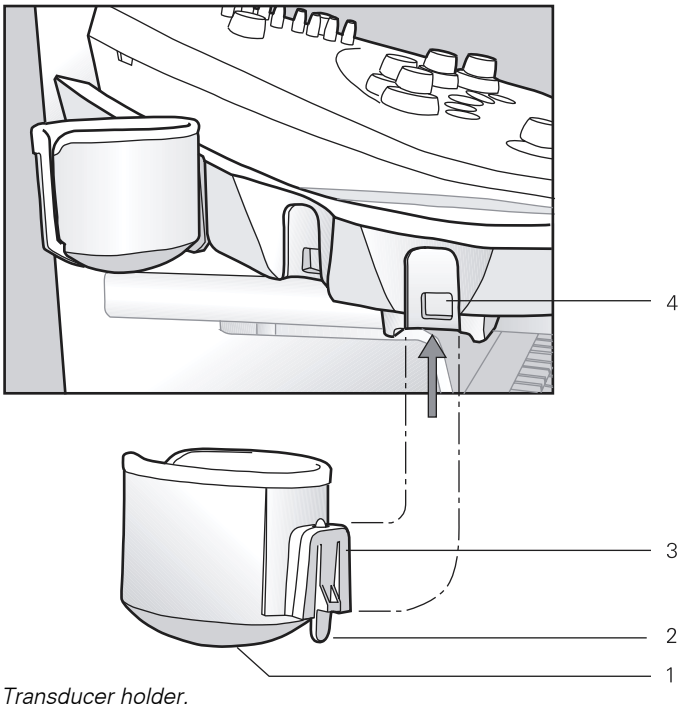
Protective Transducer Holder

⚠ **Caution:** Transducer holders have variable sizes, both in depth and diameter. To avoid transducer damage, you must use the holder or insert provided for transducers that have small or large diameter handles or for specialty transducers, such as endocavity transducers.

After connecting a transducer to the system, place the transducer in the protective holder attached to the control panel platform. There is also a holder for the coupling agent (gel).

Transducer Holders

The transducer holders on the sides of the control panel are interchangeable and replaceable.



1 Holder
2 Tab
3 Support
4 Point of attachment

Transducer holder.

Transducer Cable Management

Use the transducer cable hooks to manage one or more transducer cables. The transducer cable hooks support your cables and protect them from contact with the floor.

To install a transducer cable hook:

Note: A transducer cable hook can mount on any transducer holder. A transducer cable hook cannot mount on a gel holder.

The transducer cable hook mounts between the transducer holder and the point of attachment on the ultrasound system.

Instructions for Use

Transducer Holders 4-21

1. Remove the transducer holder from the ultrasound system:

   Reach under the holder to locate the tab on the holder. The tab extends below the point of attachment to the ultrasound system. Squeeze the tab towards the holder and pull the holder downward.

2. Attach the transducer cable hook to the transducer holder:

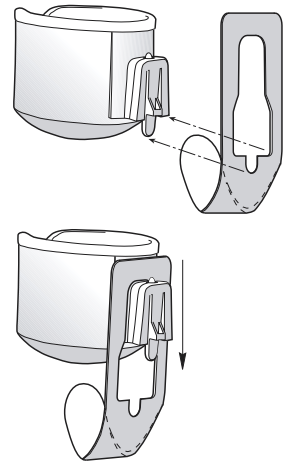
   Note: Ensure that the cable hook is oriented toward the cup side of the transducer holder before mounting the transducer holder onto the ultrasound system.

   a. Align the widest part of the open area on the cable hook with the support on the transducer holder.

   b. Slide the cable hook downwards over the transducer holder support, engaging the cable hook onto the transducer holder.

3. Reattach the transducer holder to the system:

   Align the support on the holder directly below the point of attachment on the ultrasound system and firmly push upwards until the holder snaps into place.

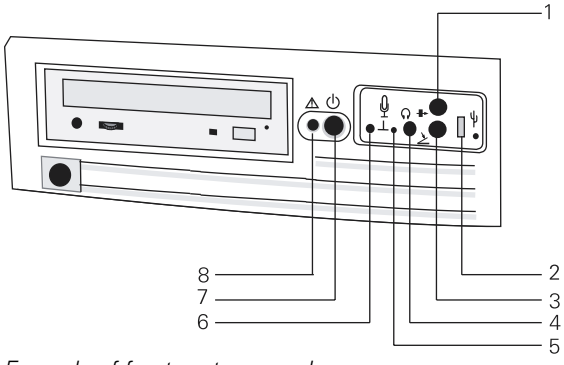


Transducer cable hook.

Connecting System Accessories

The ultrasound system has connections for system accessories.

Front System Panel



Example of front system panel.

1 PS2 Port (Barcode Connection)
2 USB-A Connection
3 Footswitch Connection
4 Headphone Connection
5 LED for Microphone
6 Microphone Connection
7 On/Off Switch ⏻
8 LED for On/Off Switch

Footswitch

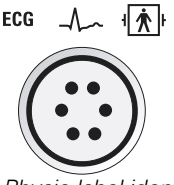
Attach the optional Footswitch connector into the corresponding socket located on the front system panel.

Physio Cables

Attach the optional Physio leads and auxiliary connectors to the Physio panel, located on the left front of the system.

The optional Physio feature allows the system to display a scrolling ECG waveform on the image screen.

Note: The Physio inputs are Defibrillation Proof. However, in the event of defibrillation while using the Physio function, the Physio inputs may become saturated (overloaded). An ECG pattern may not be visible for up to 30 seconds. After this time, the Physio function should return to normal operation.



Physio label identifying the connector socket.

To connect the Physio cables:

- Connect the six-pin Physio cable to the socket labeled ECG on the front of the system.

Input/Output Panel Connections

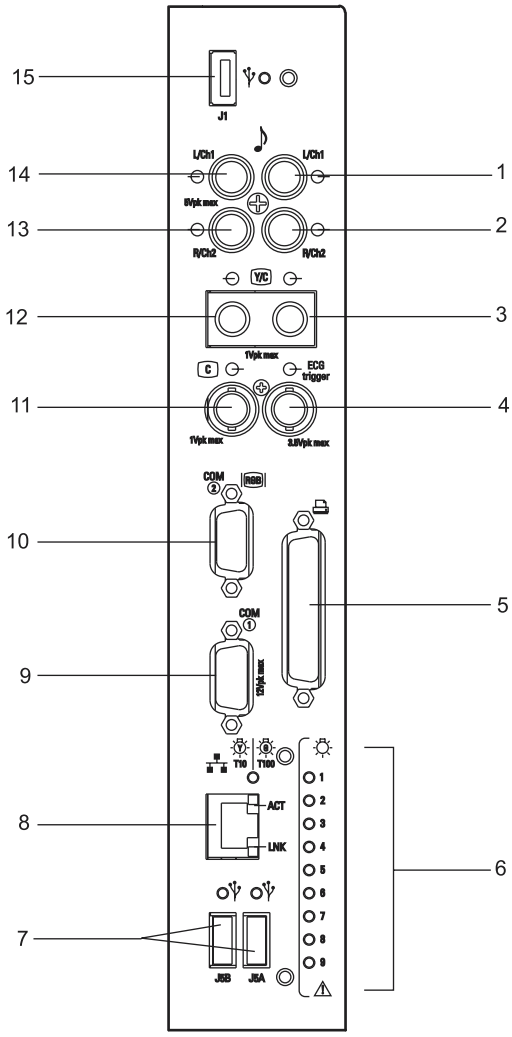
Audio and video connections are located on the Input/Output (I/O) panel.

⚠ **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to the signal input or signal output port configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult Siemens service department or your local Siemens representative.

⚠ **Caution:** To ensure proper grounding and leakage current levels, it is the policy of Siemens to have an authorized Siemens representative or approved third party perform all on-board connections of documentation and storage devices to the ultrasound system. The *System Reference* lists the peripheral devices specified for use with the ultrasound system.

System Reference

RESOURCES:
Accessories and Options Ch 2



Input/Output connections.

1 Left Audio Out to VCR
2 Right Audio Out to VCR
3 Video Out to VCR
4 Physio Trigger Out
5 Parallel port (printer)
6 System status LEDs
7 USB-A ports (printers): J5B, J5A
8 Network
9 VCR RS-232 In, COM 1
10 RGB/S video and limited COM 2
11 Composite Video Out
12 Video In from VCR
13 Right (Channel 2) audio in from VCR
14 Left (Channel 1) audio in from VCR
15 USB-A port (modem), J1

Connecting Peripheral Equipment

On-board peripheral devices must be installed by an authorized Siemens representative or by a Siemens approved third party. Any use of other devices with the system will be at the user's risk and may void the system warranty.

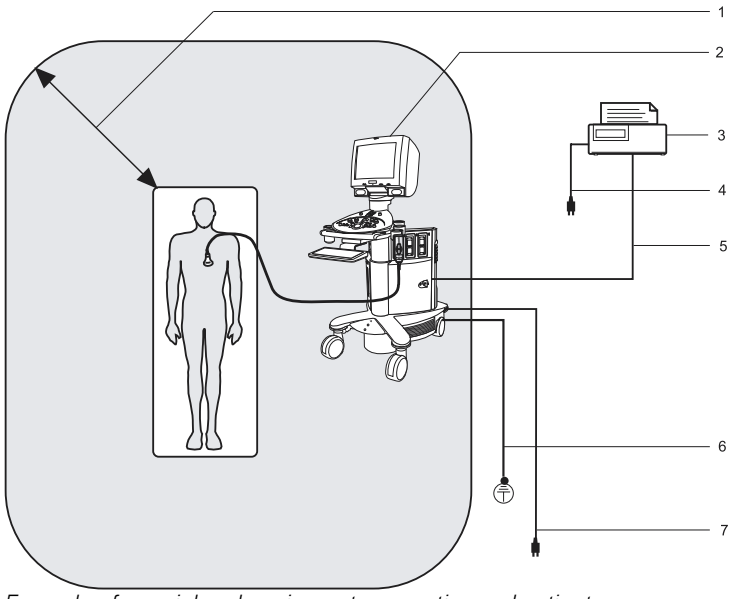
In order to fulfill EN 60601-1-1 and IEC 60601-1-1 (Medical Electrical Equipment, Part 1: General Requirements for Safety) requirements, connection of peripheral equipment to your ultrasound system must adhere to one of the following conditions:

- The peripheral equipment itself is a medical device approved according to EN 60601-1 and IEC 60601-1, or
- Non-medical peripheral equipment approved according to any other EN or IEC standard (EN XXXXX or IEC XXXXX, e.g., equipment complying with EN 60348 and IEC 60348, EN 60950 and IEC 60950, etc.) must use the following setup for connection:
  - Connect the ultrasound system to an independent protective earth terminal, with a ground wire connection to the ultrasound systems equipotential connector. Ensure that the protective earth wire is connected to a qualified protective earth connection independent of the existing systems earth connection (via the power cable).
  - The peripheral equipment is located at least 1.5 meters (1.8 meters [6 feet] in Canada and the U.S.A.) outside of the patient environment. A patient environment is defined as the area in which medical examination, monitoring, or treatment of the patient takes place.
  - The peripheral equipment is connected to a main outlet outside the patient environment but still within the same room as the ultrasound system.

Equipotential connector located on AC tray panel of the ultrasound system.

For additional information and other possible combinations, please refer to the Medical Electrical Equipment Standard EN 60601-1-1 or IEC 60601-1-1, Annex BBB.7, Scenario 3c.

Note: The above information is based on current EN 60601-1-1 and IEC 60601-1-1 standards, dated 1992. If your country's regulatory standards for medical equipment do not correspond to EN 60601-1 and IEC 60601-1 as well as EN 60601-1-1 and IEC 60601-1-1, your local requirements may be different.



Example of a peripheral equipment connection and patient environment.

1 Patient environment (represented by shading, extending exactly 1.5 meters (1.8 meters [6 feet] in Canada and the U.S.A.) around patient and ultrasound system)
2 Ultrasound system
3 Peripheral equipment (EN XXXXX and IEC XXXXX)
4 Peripheral equipment power
5 Printer data cable
6 Additional Protective Earth
7 Ultrasound system power

On-board vs. off-board documentation devices

⚠ **WARNING:** Do not connect any off-board device to an AC outlet on the ultrasound system. Doing so will cause the ultrasound system to be out of compliance and may create a safety hazard.

Note: Only authorized Siemens representatives are permitted to install documentation devices on-board the ultrasound system.

System Reference

PATIENT DATA:
Installing Off-Board Printers Ch 2
Installing the Off-Board Video Cassette Recorder (VCR) Ch 2

On-board documentation devices must be installed by authorized Siemens representatives.

Off-board documentation devices are user installable.

An off-board documentation device has a data cable connecting it to the ultrasound system, but is connected to AC power separate from the ultrasound system. An off-board documentation device is located separately, for example: on a table next to the ultrasound system.

Up to three documentation devices in total may be connected to the ultrasound system. All installed documentation devices may be controlled from the ultrasound system.

The following configurations are supported:

- One off-board device and two on-board devices.
- Up to two off-board devices and one on-board device.
- Up to three off-board devices when there are no on-board devices.

System Ergonomics

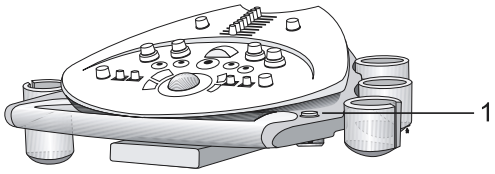
You can make the following adjustments to the system:

Monitor – You can tilt and swivel the monitor for optimal viewing while scanning. The sides of the monitor provide a general hand hold for tilting and swiveling the monitor.

Keyboard – You can slide the keyboard out away from the control panel when in use, and back under the control panel when not in use.

Height Adjustment Control – You can adjust the height of the monitor, control panel, and keyboard by pressing the Height Adjustment control and pulling up or pushing down.

Note: When two on-board peripheral devices are installed, the Height Adjustment control is locked in the highest position.



1 Height adjustment control

Location of the Height Adjustment control.

Configuring the Print/Store Function

Print/Store

You can designate a **PRINT/STORE** key for saving and/or printing, choose the output format for saved and printed images, configure additional storage, and set print options, such as print timing. Use the system presets to set this configuration.

Assigning Functions to the Print/Store Keys

Use the system presets to assign print and/or store functions to each **PRINT/STORE** key. These keys are located on the control panel.

When you press a **PRINT/STORE** key that is assigned the store function, the system stores the image to its hard disk (**Local Database**).

To assign the print function to a PRINT/STORE key:

1. Press the **Presets** key located on the keyboard, or select the **Presets** shortcut button at the bottom of the screen.
2. Select the **Print/Store** menu on the left of the screen.

   The system displays the **Print/Store** menu. In the **Print Routing** section on the upper right of the screen, the system displays a graphic for each **PRINT/STORE** key. Under each **PRINT/STORE** key graphic are drop-down menus for printer selection and a **Store** check box.
3. Select a printer for each drop-down menu located under the graphic for the required **PRINT/STORE** key:
   - **BW** (black and white images)
   - **Color Doppler** (images with color)
   - **Tinted** (images with tint; map 5-11 for 2D-mode or M-mode, map 4-11 for Doppler)
   - **2D Ref** (images with color in the 2D portion)
   - **Misc** (secondary capture images)

4. Select the **Configure Printers** tab and enable the required **Auto Transfer** (print timing) option for each printer:
   - **During Exam** – system prints when film sheet is full, according to selected layout
   - **End of Exam** – system prints when examination ends
   - **Disabled** – system prints when user accesses the **Filming** screen and then selects the **Expose Film Task** button
5. Select the **Save** button to save your settings.

To assign the store function to a PRINT/STORE key:

1. Press the **Presets** key located on the keyboard, or select the **Presets** shortcut button at the bottom of the screen.
2. Select the **Print/Store** menu on the left of the screen.

   The system displays the **Print/Store** menu. In the **Print Routing** section on the upper right of the screen, the system displays a graphic for each **PRINT/STORE** key. Under each **PRINT/STORE** key graphic are drop-down menus for printer selection and a **Store** check box.
3. Select the **Store** check box located under the graphic for the required **PRINT/STORE** key.
4. Select the **Save** button to save your settings.

Choosing the Output Format for Images

Print/Store

Use the system presets to choose one of the following output formats for printed and stored images:

- Secondary Capture – Includes any displayed graphical user interface elements such as the Parameter menu and stores them within the image.
- Ultrasound image, without overlays – Omits any displayed graphical user interface elements. Stores graphics and image text (such as annotations) within the image.
- Ultrasound image, with overlays – Omits any displayed graphical user interface elements. Stores graphics and image text (such as annotations) as an overlay separate from the image, allowing you to enable or disable their display during review (using the **Filming** screen or **Review** task card).

Note: Images saved in the ultrasound image output format (with or without overlays) can be recalled for measurements after the examination ends.

1. Press the **Presets** key located on the keyboard, or select the **Presets** shortcut button at the bottom of the screen.
2. Select the **Print/Store** menu on the left of the screen.

   The system displays the **Print/Store** menu. At the bottom of the screen, the system displays two tabs: **Configure Store** and **Configure Printers**.

3. Select the **Configure Store** tab and then complete the configuration indicated below.

To choose this image format:	Do this…
Secondary capture	Select the **Secondary Capture** check box.
Ultrasound image, without overlays	Clear the **Secondary Capture** check box and select the **Graphics in Pixel Data** check box.
Ultrasound image, with overlays	Clear the **Secondary Capture** check box and clear the **Graphics in Pixel Data** check box.

4. Select the **Save** button to save your settings.

Selecting Image Text for Display

Basic System

Use the system presets to select image text for display on images saved in the ultrasound image output format.

Image text includes patient name, imaging parameter values, and scale markers. For images saved with overlays, you can hide or display the image text at any time, regardless of the configured display selections.

To select image text for display:

1. Press the **Presets** key located on the keyboard, or select the **Presets** shortcut button at the bottom of the screen.
2. Select the **Basic System** menu on the left of the screen.
3. Select the **Image Text Editor...** button at the top of the screen.

   The system displays the **Image Text Configuration** dialog box.
4. Select the required image type from the **View Name** drop-down box at the top of the dialog box.
5. To include a line of image text in the display, select the check box.
6. To omit a line of image text from display, clear the check box.
7. Select the **OK** button at the bottom of the dialog box.

   The system saves your changes.

Configuring Additional Storage

Print/Store

You can configure the system to store images to other destinations in addition to the default location of the system's hard disk (**Local Database**). These additional destinations are listed in the **Store Server** column of the **Configure Store** tab accessed from the **Print/Store** system presets menu.

Use the system presets to configure the system to disable storage for a selected **Store Server** destination or to enable storage of images to a selected **Store Server** destination during or after the examination.

To configure additional storage:

1. Press the **Presets** key located on the keyboard, or select the **Presets** shortcut button at the bottom of the screen.
2. Select the **Print/Store** menu on the left of the screen.
3. Select the **Configure Store** tab.

   The system lists all devices (destinations) that have been configured for data transfer.

4. Select the required destination from the **Store Server** column and then select the required timing option from the **Auto Transfer** drop-down menu on the lower left of the **Configure Store** tab:
   - **Disabled** – system does not store images to the selected **Store Server** destination
   - **End of Exam** – system stores all images (that were saved during the examination) to the selected **Store Server** destination when the examination ends
   - **During Exam** – system stores the image to the selected **Store Server** destination (in addition to the default location of the system's local database) when you press a **PRINT/STORE** key that is configured for storage
5. Select the **Save** button to save your settings.

Configuring Print Preferences

Use the system presets to configure print preferences such as paper/film size, layout, and timing (print during or after the examination).

Print/Store

To configure print preferences:

1. Press the **Presets** key located on the keyboard, or select the **Presets** shortcut button at the bottom of the screen.
2. Select the **Print/Store** menu on the left of the screen.
3. Select the **Configure Printers** tab and configure the following options for each printer.
   - **Auto Transfer** (on the lower left of the **Configure Printers** tab) – Timing of the print:
     - **During Exam** – system prints when film sheet is full, according to selected layout
     - **End of Exam** – system prints when examination ends.
     - **Disabled** – system prints when user accesses the **Filming** screen and then selects the **Expose Film Task** button
   - **Media Size** – Paper/film size.
   - **Layout** – Film sheet (page) layout, such as 4:1 (four images per printed page).
   - **Orientation** – Landscape or portrait orientation of page (film sheet).
   - **Optimize large sheet** – Adjust settings to increase speed of printing large film sheets on DICOM printers.

   Note: You must cycle power to the system to activate a changed setting for the **Optimize large sheet** check box (cleared or selected).
4. Select the **Save** button to save your settings.

5 Beginning an Examination

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Patient Registration

Use the **Patient Registration** form to search for previously entered registration data, register a patient for immediate examination, or pre-register a patient for a later examination.

To access the Patient Registration form:

- Press the **Patient** key located on the keyboard, or select the **Patient Registration** shortcut button at the bottom of the screen.

Registering or Pre-registering a Patient

You can register a patient and begin an examination, or you can pre-register a patient for a later examination.

Pre-registration allows you to enter patient data for a patient without starting the examination. You can then retrieve this previously entered patient data at a later time to begin the examination. The system stores the patient data for pre-registered patients in the **Scheduler**, which is located on the system's hard disk and accessed from the patient browser. If a HIS/RIS (Worklist) server is not connected to the system, then the system automatically removes the patient data for the pre-registered patient from the **Scheduler** when the patient is registered.

System Reference

PATIENT DATA:
Patient browser,
Scheduler,
Worklist Ch 1

Note: You can schedule a patient and procedure(s) using a connected HIS/RIS (Worklist) server. Use the patient browser to retrieve patient data for scheduled patients.

You can also retrieve previously entered patient data for registration. Use the system presets to configure the search location(s) for previously entered patient data, the maximum patient records to display for a search, and the type of data to list for a search.

Basic System

To register or pre-register a patient:

1. Press the **Patient** key located on the keyboard, or select the **Patient Registration** shortcut button at the bottom of the screen.

   The system displays the **Patient Registration** form.

2. Select the **New Patient** button on the upper left of the form (if the button is available).

   The system clears entries in the **Patient Registration** form.

3. To retrieve patient data previously entered (for a previous patient or a pre-registered patient):

   Note: Use an asterisk (*) to indicate partially known values. For example, to search for the last name "Miller", you can enter "Mil*" or "*ler" in the **Patient Name** field.

   a. Use the keyboard to enter known information (if any) in the **PATIENT** section of the form.

   b. Select **Search** on the lower right of the form.

      The system displays the **Patient Search** dialog box and lists matching patient data.

      Note: The system searches the locations configured in the system presets.

   c. Select a patient and then select the **OK** button on the lower left of the **Patient Search** dialog box.

      The system populates the fields of the **Patient Registration** form with the data for the selected patient.

4. Use the keyboard to enter or edit information in the **PATIENT** section and **INSTITUTION** section of the form.

   Note: The patient name (**Last Name**, **First Name**, and **Middle Name** combined) is limited to 60 characters.

5. Select a transducer and study type from the **EXAM** section of the form.

System Reference

PATIENT DATA:
Registering or Re-registering Patients from the Patient Browser Ch 1
Restarting a Study Ch 1

Instructions for Use

Fields in the Patient Registration form 5-6

6. For OB or GYN examinations, select **OB** or **GYN** from the **Study** field (drop-down menu), and then enter clinical-specific data into the **HISTORY** section.
7. To pre-register the patient (store the registration data in the **Scheduler**):
   a. Select **Preregister** at the bottom of the **Patient Registration** form.

      The system stores the entered registration data in the **Scheduler** and clears entries in the **Patient Registration** form.

   b. To pre-register another patient, enter the required registration data and then select **Preregister** at the bottom of the **Patient Registration** form.
   c. Select the **Cancel** button at the bottom of the form to exit the **Patient Registration** form.

      The system removes the **Patient Registration** form from the screen and displays the **Image** task card.
8. To store the entered registration data as an image and then begin the examination using the entered registration data, press a **PRINT/STORE** key located on the control panel that is assigned the store function.

   The system ends the examination in progress, if any, removes the **Patient Registration** form from the screen, and displays the **Image** task card. The system stores an image of the entered registration data to the system's hard disk.
9. To begin the examination using the entered registration data, select **OK** at the bottom of the **Patient Registration** form. (You can also select the **Patient Registration** shortcut button at the bottom of the screen or press the **Patient** key on the keyboard.)

   The system ends the examination in progress, if any, removes the **Patient Registration** form from the screen, and displays the **Image** task card.

System Reference

PATIENT DATA:
Scheduler Ch 1

Fields in the Patient Registration Form

Basic System

The **Patient Registration** form includes the following sections: **PATIENT**, **INSTITUTION**, **EXAM**, and **HISTORY**. Use the system presets to select the required date format and to create entries for the **INSTITUTION** section. The selected date format is displayed to the left of the **Date of Birth** field.

Patient Data

In this field:	Enter the…
Last Name	Patient's last name. If a last name is not entered, then the system generates the name "Unknown". **Note:** The patient name (**Last Name**, **First Name**, and **Middle Name** combined) is limited to 60 characters.
First Name	Patient's first name.
Middle Name	Patient's middle name.
Patient ID	Identification code for the patient. If an identification (ID) is not entered, then the system generates a unique identifier starting with the system date and time. This ID code displays on the image screen. If there is not enough space for the entire code to display on the image screen, a portion of the code is displayed followed by three dots (…).
Date of Birth	Patient's date of birth using the date format selected in the system presets. When you enter or change this value, the system calculates and displays values for **Age**. If a date of birth is not entered before the examination is completed, then the system generates the date of birth "11/18/1858", but does not display this date on the form.
Age	The system automatically calculates and displays the patient's age based on the **Date of Birth**, if entered.
Sex	Patient's sex. If **Male** or **Female** is not selected, then the system selects **Other**.
Height	Patient's height using the measurement system selected in the system presets: **Metric** or **U.S.**
Weight	Patient's weight using the measurement system selected in the system presets: **Metric** or **U.S.**
BP [mmHg]	Patient's blood pressure.

History (OB or GYN Study)

In this field:	Enter…	History OB	History Gyn
Date LMP/IVF	Select either **LMP** or **IVF**. For the **LMP**, enter the start date of the patient's Last Menstrual Period (LMP) using the date format selected in the system presets. For **IVF**, enter the date of in-vitro fertilization using the date format selected in the system presets. When you enter or change this value, the system calculates and displays values for **Age (wks days)** and **EDC**.	✓	✓
EDC	The system automatically calculates and displays the Estimated Date of Confinement (EDC) if a value already exists for **Date LMP/IVF** and/or **Age (wks days)**. Enter the Estimated Date of Confinement (EDC) using the date format selected in the system presets. When you change a value (other than zero) for **EDC**, the system recalculates and displays values for **Date LMP/IVF** and **Age (wks days)**.	✓	
Age (wks days)	The system automatically calculates and displays the fetal age in weeks and days if a value already exists for **Date LMP/IVF**. Enter the fetal age in weeks and days. When you enter or change this value, the system calculates and displays values for **Date LMP/IVF** and **EDC**.	✓	
No. Fetuses	The system assumes a single fetus, unless you specify otherwise (up to four). If more than one fetus is present, enter the number of fetuses to enable the multiple gestation analysis capability (Fetus A, B, C, D).	✓	
Gravida **Para** **Aborta** **Ectopics**	Patient's history of pregnancies. The entries in these fields are transferred to the Patient Report, but do not display on the image screen.	✓	✓
Additional Info.	Enter any additional data or comments that relate to the patient.	✓	✓

Institution

Note: When you enter a new value into an **INSTITUTION** field (assuming that the maximum number of entries for that field has not been reached), the system automatically adds the entered value as a new entry to the registration configuration list in the system presets.

Basic System

In this field:	Enter the…
Institution Name	Name of the institution.
Performing Physician	Physician's name.
Referring Physician	Referring physician's name.
Operator	Your initials or other identifying code.

Exam

Field	Description
Transducer	Lists the available transducers.
Study	Lists the system-defined study types, using the following abbreviations: ▪ **Abd-Detailed** – Abdomen Detailed ▪ **Abd-Difficult** – Abdomen Difficult ▪ **Abdomen** – Abdomen ▪ **Breast** – Breast ▪ **CV** – Cerebrovascular ▪ **Digital** – Digital ▪ **Fetal Echo** – Fetal Echo ▪ **Gyn** – Gynecology ▪ **MSK** – Musculoskeletal ▪ **Neo Head** – Neonatal Head ▪ **OB** – Obstetrics ▪ **Ped Abd** – Pediatrics Abdomen ▪ **Ped Hip** – Pediatrics Hip ▪ **Pelvis** – Pelvis ▪ **Penile** – Penile ▪ **Prostate** – Prostate ▪ **PV-Art** – Peripheral Vascular Arterial ▪ **PV-Ven** – Peripheral Vascular Venous ▪ **Renal** – Renal ▪ **Sup MSK** – Superficial Musculoskeletal ▪ **TCD** – Transcranial Doppler ▪ **Testis** – Testis ▪ **Thyroid** – Thyroid
Request ID	Identification code for the procedure in the imaging service request. An imaging service request identifies attributes that are common among the requested procedures. Typically generated by a HIS/RIS (Worklist) server.
Accession No	Identification code indicating the sequence of the current study as related to other studies for this patient. Used for billing purposes. Typically generated by a HIS/RIS (Worklist) server.
Indication	Information describing the symptom or particular circumstance that indicates the advisability or necessity of a specific medical procedure.

During the Examination

During an examination, you can correct registration data, begin a new study, select a different transducer or imaging mode, optimize the image, print and store images, activate the measurement function, and view the patient report.

Correcting Registration Data

Instructions for Use

Fields in the Patient Registration Form 5-6
Beginning a New Study 5-11

You can edit entries in the **Patient Registration** form (except the **Study** field) at any time during the patient examination. The study type you select determines the exam type used during the examination. You cannot change the study type during an examination, but you can begin a new study. Images stored before you correct registration data may contain incorrect image text (such as the original, incorrect patient name).

Note: Registration data received from a connected HIS/RIS (Worklist) server cannot be corrected using the **Patient Registration** form.

To display and edit the current Patient Registration form:

1. Press the **Patient** key located on the keyboard or select the **Patient Registration** shortcut button at the bottom of the screen.

   The system displays the current patient's registration form.

2. Select **Correct** at the top of the form.
3. Use the keyboard to update your entries.
4. Select **OK** to save the changes. To exit the **Patient Registration** form without saving changes, select **Cancel**.

Study Type Selection

Instructions for Use

Study Type Abbreviations 5-9

The system lists study type abbreviations in the **Patient Registration** form. The study type you select determines the exam type used during the examination. You cannot change the study type during an examination, but you can begin a new study.

Note: You can optimize an image during the examination using the **Exam** drop-down menu on the mode-specific Parameter menu.

To select a study type during registration:

- Select the required study type from the **Study** field in the **EXAM** section of the **Patient Registration** form.

To begin a new study (during the examination):

1. Press the **Patient** key located on the keyboard, or select the **Patient Registration** shortcut button at the bottom of the screen.

   The system displays the **Patient Registration** form, containing data for the current patient examination.

2. Select **New Study** at the top of the form.
3. As necessary, update entries in the **Study** and **Transducer** fields of the form and then select **OK** in the **Patient Registration** form to begin a new study.

   The system ends the study in progress, begins the new study, and displays the **Image** task card.

Transducer Selection

Use the **Transducer** field in the **EXAM** section of the **Patient Registration** form to select the transducer. If a transducer is not selected, the system activates the default transducer for the selected study type if it is connected to the system. The name of the selected transducer displays on the mode-specific Parameter menu.

Note: You can select a transducer during the patient examination using the **Transducer** drop-down menu on the mode-specific Parameter menu.

Selecting an Imaging Mode

When the system is powered on, it automatically displays in 2D-mode. You can change imaging modes by pressing the mode controls located on the control panel.

The ultrasound system has the following modes available:

- **2D-mode** – 2D-mode is the default setting. When the system is powered on, the image screen displays in 2D-mode.
- **M-mode** – M-mode displays a 2D image and an M-mode sweep.
- **Doppler** – Doppler displays a Doppler spectrum with a 2D image, either simultaneously or using the update function.

  The update function toggles a frozen 2D image with a real-time Doppler spectrum, or a real-time 2D image with a frozen Doppler spectrum.
- **Color** – Color displays in a 2D-mode image.
- **Power** – Power detects and assigns color to the energy generated by the reflections of blood flow in a 2D image.

Optimizing the Image

You can activate each mode of operation using the mode controls located on the control panel. Mode-specific menus and selections display on the left of the screen in the **Image** task card. Each imaging mode has a mode-dependent ***Parameter menu*** used to adjust imaging parameters, such as dynamic range, transmit frequency, and edge enhancement.

Controls for imaging formats and mixed-mode Update Styles, SieScape™, 3-Scape™, on-screen Biopsy guidelines, VCR recording, and Physio settings are organized into group boxes that display below the Parameter menu on the screen. Other controls for optimizing an image are located on the control panel.

Instructions for Use

Mode controls	Ch 3
Review task card	Ch 3
Configuring the Print/Store keys	Ch 4

Printing and Storing Images

Print/Store

You can print and store images during an examination (active study). Use the system presets to assign print and/or store functionality to each **PRINT/STORE** key. Also use the system presets to select printing options (such as film size) and output format for printed and stored images (such as the screen capture format).

After you press a **PRINT/STORE** key, the system briefly displays a counter representing the **PRINT/STORE** key on the lower right of the screen.

The counter indicates the number of times the related **PRINT/STORE** key was pressed during the current study. A counter is assigned to each **PRINT/STORE** key.

To print an image during an active study:

- Press the **PRINT/STORE** key assigned to the printing function.

  The system sends a request to the printer that is configured for the type of image printed. The image is also stored to the local database.

  Note: Images printed (that are not also stored) during the active study are not displayed in the **Review** task card.

To store an image during an active study:

- Press the **PRINT/STORE** key assigned to the storing function.

  The system stores the image to the local database.

Images in the Review Task Card

You can review stored images using the **Review** task card. All images for the current study, including images stored in previous examinations within the study folder, are displayed on the **Review** task card. For example, if you restart a completed study (by re-registering a patient), the system displays images on the **Review** task card from all previous examinations within the study folder in addition to images stored during the current examination.

System Reference

PATIENT DATA:
Copying stored images to the Filming screen for printing Ch 1
Restarting completed studies Ch 1

Activating the Measurement Function

Basic System 2

Measurements can be performed on real-time or frozen images. To activate the measurement function, select the **Calcs** task card at the bottom of the screen. Use the system presets to automatically activate the measurement function when you press the **FREEZE** key.

Using the Patient Report

You can view, edit, print, and store the patient report for the currently registered patient.

Note: Patient report data is not automatically retained by the system after the examination ends. If a record is required, print or store the patient report before ending the examination.

System Reference

CALCS:
Measurement function Ch 1
Patient reports Ch 1
PATIENT DATA:
Printing reports from previous examinations Ch 1

Accessing and Editing the Patient Report

You can access and edit the patient report for the currently registered patient.

To access and edit the patient report:

Note: The fields displayed in a patient report depend on the selected study type. Patient reports cannot be edited after the examination ends.

1. Press the **Report** key on the keyboard or select the **Reports** shortcut button at the bottom of the screen.

   The system displays the **Patient Report** screen.

2. Roll the trackball to each required field and then press the **SELECT** key on the control panel.
3. If the field is a drop-down menu, select an option.
4. If the field is a text box, use the keyboard to enter text.

   The system automatically saves your changes and places an asterisk to the right of the edited measurements.

Printing and Storing the Patient Report

Patient reports are stored as images (screenshots). You can print either the displayed portion or all portions of the patient report.

To print the entire contents of the patient report:

Note: The **Print Report** button on the lower left of the **Patient Report** screen is available for systems connected to a supported laser printer only.

- Select the **Print Report** button on the lower left of the **Patient Report** screen.

  The system sends all portions of the patient report to the connected laser printer.

To print the patient report as a screenshot (displayed portion only):

- Press the **PRINT/STORE** key assigned to the printing function.

  The system sends a request for the displayed portion of the patient report to the printer configured for miscellaneous images. The system also stores the patient report as an image (screenshot) to the local database.

Instructions for Use

Print/Store setup Ch 4

To store the displayed patient report (displayed portion only):

- Press the **PRINT/STORE** key assigned to the storing function.

  The system stores the patient report as an image (screenshot) to the local database.

Examination Completion

You can end an examination (study) from the **Review** task card or the **Patient Registration** screen.

To end the current examination (study):

- Select the **Review** task card tab and then select the **End Exam** button on the lower left of the screen; or
- Press the **Patient** key on the keyboard, select **New Patient**, enter data for another patient, and select the **OK** button at the bottom of the **Patient Registration** form to register the new patient and begin a new examination; or
- Press the **Patient** key on the keyboard, select **New Study**, update fields as required, and select the **OK** button at the bottom of the **Patient Registration** form to begin a new study for the current patient.

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Registering a New Patient 5-3
Beginning a New Study 5-11

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Standard Features ▪ SONOLINE Antares

The SONOLINE Antares ultrasound system includes the standard features described in this section.

Operator Control Panel

- Task lighting and backlit controls and keys
- Control panel and monitor height adjustment for standing and sitting positions
- Language-specific alphanumeric keyboard with special function keys
- Control panel layout supports ambidexterous operation
- Control panel overlay

System Operating Software

- Multi-language support
- User-programmable system presets
- User-Defined exam type feature for defining up to 10 specific exam, transducer, and image parameter settings per exam type
- Supports DICOM file format

Processing Power

- Integrated Crescendo™ Multi-Dimensional Image Processor to process voluminous amounts of digital data, enabling innovative real-time display technologies
- GigaProcessing Technology for superior resolution, frame rates, and improved signal-to-noise ratio in all modes.
- Configurable signal processing hardware providing a pathway for future performance expansion and technological innovations

15-inch (38 cm), High Resolution Color Monitor

- 75 Hz display (PAL), 60 Hz display (NTSC)
- Tilt of 10° up and 8.5° down
- Swivel of 180°
- Adjustable monitor/control panel height
- Brightness, contrast, and degauss controls
- Built-in stereo speakers
- Progressive scan, flicker-free monitor
- Energy savings compliant per VESA Display Power Management Signaling standard

Mobility

- User-selectable height adjustment of monitor and control panel
- Central braking system and individual caster lock system
- Swivel casters with shock attenuation features
- Compact and lightweight industrial design
- Large steering handle for portability and maneuvering
- Transducer holders and cable management

Transducer Technology

- Wideband MultiHertz™ multiple frequency transducer technology
- New Generation Multi-D™ Array Transducer technology
- Hanafy Lens transducer technology
- Virtual Format Imaging feature allows image displays in linear, sector, steered, and trapezoidal format
- 2.0 to 13.0 MHz imaging range capability
- Three array transducer ports
- 360-pin connection
- Electronic transducer selection
- Lightweight, ergonomic transducer design with SuppleFlex cables

User-Accessible Connections

- Recordable compact disk (CD-R) drive and hardware for storage, review, and archival of patient and image data.
- Connections for up to three documentation devices.
- USB modem port and RS-232 for user or service network connectivity.

Operating Modes

The following modes are available on the SONOLINE Antares system:

Single Modes

- 2D-mode
- M-mode
- Color
- Power
- Pulsed Doppler

Mixed Modes

- 2D/M-mode
- 2D/Doppler
- 2D-mode with color
- 2D-mode with power
- 2D/Doppler with color
- 2D/Doppler with power

Formats

- Dual, Seamless Dual image display
- Virtual Format Imaging: linear, sector, steered, or trapezoidal format
- Curved-sector, linear, and phased-sector data acquisition and display formats

General (2D) Imaging Features

- Field of view (FOV) format adjustment
- 256 gray shade display
- Up to 16 choices for magnification in frozen, CINE, or real-time imaging
- 0.25 cm to 28 cm depth of view display
- CINE memory capacity: up to 30 seconds of CINE capture
- Acquired 2D-mode frame rates up to 500 fps
- Up to five 2D-mode transmit frequencies per transducer
- Quad signal parallel processing
- Linear array transducer beam steering
- 2D/Doppler Refresh, Update, and Triplex functions
- Gain of –20 dB to 60 dB in one decibel increments
- Dynamic range of 30 dB to 70 dB in five decibel increments
- Multi-frequency Ensemble™ Tissue Harmonic Imaging feature

Instructions for Use

Post-Processing 6-12

Pulsed Wave Doppler Features

- Doppler measurements and calculations available for all linear, curved, and phased array transducers
- Fast Fourier Transformation (FFT) processing of 32 to 256 points
- FFT speed up to 1,920 FFTs per second at the highest sweep speed
- Up to four user-selectable transmit frequencies per transducer
- Simultaneous 2D-mode and Doppler display and 2D/Doppler with color (Triplex)
- User-selectable Doppler update mode
- User-adjustable Doppler scale and position controls
- Angle correction of 0° to 85° in one-degree increments
- Auto angle correction of 60/0/60
- Transmit frequencies of 2 to 9 MHz
- Downshift frequency and high-PRF Doppler
- Doppler grayscale and colorization (tint) maps
- Spectral invert
- User-selectable frequency (kHz) or velocity (m/s) display format
- Wall filter selections: 20 Hz to 1,600 Hz
- Adjustable Doppler Gate size from 0.1 cm up to 4.0 cm, depending on the transducer
- Flow angle correction on real-time or frozen images, with velocity readout update
- PRF range from 100 Hz to 52,000 Hz
- Doppler signal processing that enables automatic calculation of waveform statistics during real-time imaging
- Derived waveform Doppler trace function analyzes frozen Doppler spectra for mean and maximum velocity information. Waveform may be set to trace above baseline, below baseline, or both.
- Doppler audio output while in Doppler cursor mode
- Doppler CINE control feature—up to 30 seconds of Doppler data can be stored
- Five sweep speed selections: 25, 50, 100, 150, and 200

Instructions for Use

Post-Processing 6-12

Color Doppler Features

- 2D/Color display
- User-adjustable color region of interest (ROI), size, and position
- Independent controls for color gain, PRF, invert, baseline, resolution/frame rate, persistence, priority, and smoothing
- Up to four user-selectable transmit frequencies
- Color On/Off invert and baseline shift functions
- Three user-selectable color flow states: low, general, high
- Color-adaptive wall filter
- PRF range of 100 Hz to 19,500 Hz
- Six color velocity maps (three velocity maps and three velocity + variance maps (VV))
- Up to 512 color samples per color data line
- Up to 512 2D-mode lines plus 256 color lines

Instructions for Use

Post-Processing 6-12

Power Doppler Features

- Power mode On/Off control
- Background Power Doppler on and off selection
- Power Gain from –20 dB to 20 dB in one-decibel increments
- Independent controls for power gain, PRF, invert, baseline, resolution/frame rate, persistence, priority, and smoothing
- Up to four user-selectable transmit frequencies
- Up to eight user-selectable Power map selections
- Up to five persistence levels (0 to 4)
- Up to four levels of Power smoothing (0 to 3)
- PRF range from 100 Hz to 19,500 Hz
- Adaptive Wall filter
- Three user-selectable flow states: low, general, high

M-Mode Features

- Independent controls for M-mode gain, gate position, gate size, and sweep speed
- Dynamic range display from 30 dB to 70 dB in five-decibel increments
- M-mode gain from –20 dB to 60 dB in one-decibel increments
- M-mode zoom feature
- Five sweep speed selections: 25, 50, 100, 150, and 200
- Up to five user-selectable transmit frequencies
- Up to four user-selectable Edge Enhancement selections
- Six M-mode grayscale maps and up to 12 colorization maps
- 25-second CINE capability for measurements

Instructions for Use

Post-Processing 6-12

Ensemble Tissue Harmonic Imaging

(Standard with System)

- Available for the VF13-5, VFX13-5, VF10-5, VFX9-4, VF7-3, EC9-4, C5-2, CX5-2, CH6-2, P10-4, and PH4-1 transducers
- Up to five THI transmit frequencies per transducer

SieScape Panoramic Imaging

(Optional)

- Available on all imaging transducers without any additional attachments
- SieScape images may be created up to 60 cm in length and up to 360° when the depth is less than the radius of the target area being scanned
- CINE display of frame by frame review capability of individual data frames within the SieScape image
- On-screen reference and speed indicators enhance imaging technique
- Pause and reverse during acquisition
- Zoom and pan capabilities

Color SieScape Panoramic Imaging

(Optional, requires SieScape Panoramic Imaging software)

- Available on all imaging transducers without any additional attachments
- Color SieScape™ imaging is a combination of real-time SieScape imaging and real-time Power mode acquisition. All Power information is preserved during image acquisition, and the peak of the signal is saved for the Color SieScape image.
- On-screen reference and speed indicators enhance imaging technique
- Pause and reverse during acquisition
- Zoom and pan capabilities

SieClear Multi-View Spatial Compounding

(Optional)

- Available for the VF13-5, VFX13-5, VF10-5, VFX9-4, VF7-3, EC9-4, C5-2, CX5-2, and CH6-2 transducers
- SieClear™ multi-view spatial compounding is an optional feature that can decrease speckle in a 2D-mode image, resulting in a clear view of image structures. Reduced speckle allows low contrast lesions to stand out and boundaries to appear more continuous.
- Available in combination with THI, 3D, TEQ and Color/Doppler

TEQ technology

(Optional)

- Available on all imaging transducers without any additional attachments
- The TEQ™ technology (Tissue Equalization) optional feature automatically optimizes the overall field of view (FOV) image brightness uniformity by changing the DGC, overall gain, and lateral gain.

3-Scape Real-Time 3D Imaging

(Optional)

- Available for the VF13-5, VFX13-5, VFX9-4, CH6-2, C5-2, CX5-2, and EC9-4 transducers
- The 3-Scape™ Real-Time 3D Imaging feature is a system option that allows the acquisition of three-dimensional ultrasound images. Multi-Planar Reformatting (MPR) provides a view of each segment of the volume as an arbitrary slice.
- Real-time reconstruction during free-hand acquisition
- Simultaneous acquisition of 2D-mode and Power mode volumes can independently be reviewed in surface rendering
- Multiplanar rendering demonstrates imaging planes not accessible with normal scanning techniques

Cadence Contrast Agent Imaging

(Optional)

- Available for the PH4-1 and C5-2 transducers
- Cadence™ Contrast Agent Imaging (CCAI) is an optional system feature with wide-band, harmonic-imaging technology designed for use with contrast agents. The CCAI option includes the following techniques:
  - Ensemble Contrast Imaging (ECI) for assessment of perfusion using Low MI imaging techniques
  - Agent Emission Imaging (AEI) for detection of early-phase vascular structures or lesions using High MI imaging techniques
  - Burst for assessment of re-perfusion
- Available in combination with 2D-mode, THI, Color mode and Power mode
- On-screen stopwatch feature
- Frame rate control for intermittent imaging

Post-Processing Features in Freeze Frame or CINE

- 2D-mode
  - Zoom/pan
  - Dynamic range
  - Gray map
  - 2D-mode tint map
  - Measurements, annotations, and pictograms
- Color
  - Zoom/pan
  - Color Map
  - Color invert
  - Color baseline shift
  - Color display: on/off
  - Color priority
  - Measurements, annotations, and pictograms
- Doppler
  - Baseline shift
  - Spectral dynamic range
  - Gray map
  - Doppler tint map
  - Angle correction
  - Spectral invert
  - Measurements, annotations, and pictograms
  - Sweep speed
- M-mode
  - Dynamic Range
  - Gray Map
  - M-mode tint map
  - Measurements, annotations, and pictograms
  - Sweep speed

Standard Mainframe Package

- System Operating software includes the StellarPlus™ Performance Package software
- General Imaging software
- Biopsy software
- DICOM software
- Ensemble™ Tissue Harmonic Imaging
- High-density hard disk
- Recordable Compact Disk (CD-R) drive
- Coupling Agent (Gel), 5 liters

Options

- Universal Modem
- ECG, U.S.A. version
- ECG (EKG), European version
- Footswitch
- SieScape™ Panoramic Imaging option
- Color SieScape™ Panoramic Imaging option (requires SieScape™ Panoramic Imaging software)
- SieClear™ Multi-View Spatial Compounding option
- 3-Scape™ Real-Time 3D Imaging option
- TEQ™ technology option
- Cadence™ Contrast Agent Imaging option

Measurements and Reports

Measurements are available in during all examinations on real-time, frozen, and CINE images. All applications support annotations, pictograms, measurement tools, reports, and system presets.

Note: Images saved in the ultrasound image output format (with or without overlays) can be recalled for measurements after the examination ends.

General Functions

- 2D-mode and M-mode have unlimited sets of calipers per image for distance measurements
- Doppler has unlimited sets of calipers per image for velocity or frequency measurements
- 2D measurement tools on frozen/CINE and real-time images include distance, ellipse and trace
- 2D measurement packages include distance, area, circumference, volume, stenosis, and volume flow

General 2D-mode Measurements

- Distance/Depth
- Circumference (using a Trace or Ellipse method)
- Area (using an Ellipse or Trace method)
- Volume and Stenosis
- Volume Flow (using an Area or Diameter method with a Doppler measurement)

General M-mode Measurements

- Distance
- Heart Rate
- Slope
- Time

General Doppler Measurements

- Measurements on a frozen or CINE image including PS (peak systole), ED (end diastole), HR (heart rate), S/D (systolic/diastolic ratio), RI (resistive index), PI (pulsatility index), TAMx (time-average maximum), TAMn (time-average mean), Slope (Acceleration/ Deceleration), Volume Flow, A/B ratios, Time
- Automatic Doppler measurements on real-time Doppler images including update of PS, ED, S/D, PI, RI, TAMx, TAMn

Application-specific Measurements

The following application-specific measurements are available when using the ultrasound system.

Abdominal

- All general measurements
- Measurement labels for Abdominal, Renal, and Pelvic exams

Small Parts

- All general measurements
- Measurement labels for Breast, Thyroid, Testis, Digital, Musculoskeletal, and Superficial Musculoskeletal exams

Gynecology

- All general measurements
- Patient demographic data for previous exam date, clinical age, EDC, Gravida, Para, Aborta, Ectopics, LMP.
- 2D-mode measurement labels for cervix length, 1-6 cyst (right and left), 1-6 follicle (right and left), endometrium, ovary, prevoid and postvoid bladder, uterus, kidney,uterine artery, arcuate artery, ovarian artery.
- Doppler measurement labels for uterine artery, arcuate artery, ovarian artery, HR.
- M-mode measurement label for HR.
- Supports micturated volume (prevoid/postvoid bladder volume)
- Patient Report includes 2D-mode, M-mode, and Doppler measurements and calculations.

Vascular

- All general measurements
- Measurement labels for Cerebrovascular, TCD, Peripheral Vascular (venous and arterial), Digital exams, Penile.

Obstetrics (OB)

- All general measurements and calculations
- Calculations for gestational age (GA), Composite GA, estimated fetal weight (EFW), OB ratio, cephalic index (CI), fetal age and estimated date of confinement (EDC), micturated volume.
- Circumference measurement customization for ellipse and 2D-mode trace.
- Demographic information including gravida, para, aborta, ectopics, last menstrual period (LMP), clinical age (calculated off LMP), EDC (based on clinical age), number of fetuses, and calculated in-virtro fertilization (IVF).
- 2D-mode measurement labels that calculate GA including BPD, HC, AC, FL, CRL, GSD, binocular distance, humerus, tibia, ulna, clavicle, and foot
- 2D-mode measurement labels that do not calculate GA including AFI, APAD, LVW, OFD, TAD, TC, TCD, HW, FTA, cervix length, radius, yolk sac, cisterna magna, nuchal thickness, fetal kidney, maternal kidney, fetal aorta, MCA, ovarian artery, uterine artery, umbilical artery.
- 2D-mode measurement ratios including CI, HC/AC, FL/AC, FL/BPD, FL/HC, TCD/AC, LVW/HW.
- Doppler measurement labels including fetal aorta, MCA, ovarian artery, uterine artery, umbilical artery, fetal HR.
- M-mode measurement labels including fetal HR.
- Amniotic fluid compound measurement with quantitative technique for assessing the amniotic fluid volume.
- Patient Report includes the following for OB: composite calculations, 2D-mode measurements that calculate GA, measurements for non-GA, 2D measurement ratios, Doppler and M-mode measurement and calculations, growth analysis.
- Up to 10 user-defined measurement labels each for 2D-mode, Doppler, 2D/Doppler, and M-mode.
- Editable reports.
- Growth analysis including GSD, CRL, BPD, HC, AC, FL, HL, EFW, HC/AC.
- User-defined OB tables
- Quadruples

Pediatric

- Neonatal Head unlabeled measurements
- Hip Angle 2D-mode measurement labels for left and right hip, and a Graf sonometer for each side

Fetal Echo

- Fetal Echo measurement labels for 2D-mode for left and right heart structures, cardiothoracic area, and arteries.
- Fetal Echo measurement labels for M-mode for left and right heart structures
- Fetal Echo measurement labels for Doppler for valves, ventricles, arteries, and veins.
- Fetal Echo measurement ratios for 2D-mode LV percentage of fractional shortening and for Doppler mitral valve E/A and Tei Index.
- Fetal Heart Rate

Urology

- All general measurements and calculations
- Measurement labels for Penile, Pelvis, and Prostate exams
- Prostate volume calculation

Measurement Range and Accuracy

The following tables describes the variability in accuracy for clinical measurements.

Clinical Measurements: Range and Accuracy

Direct Measurement	Range	Tolerance Function or Value (System Variability)
Distance	0 – 36 cm	3% of the distance or 2.0 mm; whichever is greater assuming 1540 m/sec speed of sound. Does not apply to trace tool. Distance tolerance using trace tool is user dependent.
Distance using SieScape extended field of view	0 – 60 cm	Linear format: ±5% of the distance or 2.5 mm; whichever is greater assuming 1540 m/sec speed of sound. Curved or sector format: ±8% of the distance or 2.5 mm; whichever is greater assuming 1540 m/sec speed of sound.
Trace Area	0 - 560 cm^2	6% of the area or 2.7 cm^2; whichever is greater, assuming minimal operator error in tracing the desired object and assuming 1540 m/sec speed of sound.
Time @ Slow Sweep	0 - 9.4 sec	15 msec
Time @ Med Sweep	0 - 4.7 sec	7.5 msec
Time @ Fast Sweep	0 - 2.4 sec	3.8 msec
Velocity	10 – 600 cm/sec	10% of the velocity or 5 cm/s; whichever is greater using a J J & A string phantom at 45 degrees ±1 degree.

Direct Measurement Tolerance

Direct Measurement	Range	Tolerance Symbol	Tolerance Function or Value
Distance	0 - 36 cm	Tol(D)	3% of the distance or 2.0mm; whichever is greater assuming 1540 m/sec speed of sound. Does not apply to trace tool. Distance tolerance using trace tool is user dependent.
Distance using SieScape extended field of view	0 - 60 cm	Tol(D)	Linear transducer: 5% of the distance or 1.5 mm; whichever is greater assuming 1540 m/sec speed of sound. Curved transducer: 8% of the distance or 1.5 mm; whichever is greater assuming 1540 m/sec speed of sound.
Trace Area	0 - 560 cm^2	Tol(A)	6% of the area or 2.7cm^2; whichever is greater, assuming minimal operator error in tracing the desired object and assuming 1540 m/sec speed of sound.
Time @ Slow Sweep	0 - 9.4 sec	Tol(T) @ Slow Sweep	15 msec
Time @ Med Sweep	0 - 4.7 sec	Tol(T) @ Med Sweep	7.5 msec
Time @ Fast Sweep	0 - 2.4 sec	Tol(T) @ Fast Sweep	3.8 msec
Velocity	10 - 600 cm/sec	Tol(V)	10% of the velocity or 5 cm/s; whichever is greater using a J J & A string phantom at 45 degrees ±1 degree.

2D-Mode Measurements

2D-mode Measurements	Range or Formula	Minimum Value	Maximum Value
Distance	0-34 cm	D-Tol(D)	D + Tol(D)
Distance Ratio	D1/D2	(D1-Tol(D1))/(D2+Tol(D2))	(D1+Tol(D1))/(D2-Tol(D2))
Mean Distance	(D1+D2+D3)/3	(D1-Tol(D1)+D2-Tol(D2)+D3-Tol(D3))/3	(D1+Tol(D1)+D2+Tol(D2)+D3Tol(D3))/3
Ellipse Circumference	$\pi\{1/2[D1^2+D2^2]\}^{1/2}$	$\pi\{1/2[(D1-Tol(D1))^2+(D2-Tol(D2))^2]\}^{1/2}$	$\pi\{1/2[(D1+Tol(D1))^2+(D2+Tol(D2))^2]\}^{1/2}$
Ellipse Area	$\pi(D1)(D2)/4$	$\pi(D1-Tol(D1))(D2-Tol(D2))/4$	$\pi(D1+Tol(D1))(D2+Tol(D2))/4$
Ellipse Volume (D1 = axis of rotation)	$(\pi/6)(D1)(D2)^2$	$(\pi/6)(D1-Tol(D1))(D2-Tol(D2))^2$	$(\pi/6)(D1+Tol(D1))(D2+Tol(D2))^2$
Trace Circumference	0 - 85cm	D-Tol(D)	D+Tol(D)
Trace Area	0 - 450 cm^2	A-Tol (A)	A+Tol(A)
% Stenosis by Area	100(A1-A2)/A1	100(A1-Tol(A1)-A2-Tol(A2))/(A1+Tol(A1))	100(A1+Tol(A1)-A2+Tol(A2))/(A1+Tol(A1))
% Stenosis by Diam.	100(D1-D2)/D1	100(D1-Tol(D1)-D2-Tol(D2))/D1+Tol(D1))	100(D1+Tol(D1)-D2+Tol(D2))/(D1+Tol(D1))
Amniotic Fluid Index	AFI=D1+D2+D3+D4	D1-Tol(D1)+D2-Tol(D2)+D3-Tol(D3)+D4-Tol(D4)	D1+Tol(D1)+D2+Tol(D2)+D3+Tol(D3)+D4+Tol(D4)
Bi-plane Volume	(D1)(D2)(D3)(0.52)	(D1-Tol(D1))(D2-Tol(D2))(D3-Tol(D3))(.52)	(D1+Tol(D1))(D2+Tol(D2))(D3+Tol(D3))(.52)

Doppler Measurements

Doppler Measurements	Range or Formula	Minimum Value	Maximum Value
Velocity	20 - 600 cm/sec	V-Tol(V)	V+Tol(V)
Frequency	$2F_0V\cos\theta/1540$ F_0=Carrier Frequency	$2F_0\cos\theta$(V-Tol(V))/1540	$2F_0\cos\theta$(V+Tol(V))/1540
Delta Velocity	V1 - V2	V1-Tol(V1)-V2-Tol(V2)	V1+Tol(V1)-V2+Tol(V2)
Delta Frequency	$2F_0\cos\theta$(V1-V2)/1540	$2F_0\cos\theta$(V1-Tol(V1)-V2-Tol(V2))/1540	$2F_0\cos\theta$(V1+Tol(V1)-V2+Tol(V2))/1540
Time @ Slow Sweep	0 - 11.2 sec	T-Tol(T)@ Slow Sweep	T+Tol(T)@ Slow Sweep
Time @ Med Sweep	0 - 5.6 sec	T-Tol(T)@ Med Sweep	T+Tol(T)@ Med Sweep
Time @ Fast Sweep	0 - 2.8 sec	T-Tol(T)@ Fast Sweep	T+Tol(T)@ Fast Sweep
Time Averaged Maximum Velocity; TAMx	$(MxVel^1+MxVel^2+\ldots+MxVel^N)/N$ N=Number of Velocities Averaged	$(MxVel^1-Tol(MxVel^1)+MxVel^2-Tol(MxVel^2)+\ldots+MxVel^n-Tol(MxVel^n))/N$	$(MxVel^1+Tol(MxVel^1)+MxVel^2+Tol(MxVel^2)+\ldots+MxVel^n+Tol(MxVel^n))/N$
Time Averaged Mean Velocity; TAMn	$(MnVel_1+MnVel_2+\ldots+MnVel_N)/N$ N=Number of Velocities Averaged	$(MnVel_1-Tol(MnVel_1)+MnVel_2-Tol(MnVel_2)+\ldots+MnVel_n-Tol(MnVel_n))/N$	$(MnVel_1+Tol(MnVel_1)+MnVel_2+Tol(MnVel_2)+\ldots+MnVel_n+Tol(MnVel_n))/N$
Time Averaged Minimum Velocity; TAMin	$(MinVel_1+MinVel_2+\ldots+MinVel_N)/N$ N=Number of Velocities Averaged	$(MinVel_1-Tol(MinVel_1)+MinVel_2-Tol(MinVel_2)+\ldots+MinVel_n-Tol(MinVel_n))/N$	$(MinVel_1+Tol(MinVel_1)+MinVel_2+Tol(MinVel_2)+\ldots+MinVel_n+Tol(MinVel_n))/N$
Time Averaged Mode Velocity; TAMd	$(MnVel_1+MnVel_2+\ldots+MnVel_N)/N$ N=Number of Velocities Averaged	$(MdVel_1-Tol(MdVel_1)+MdVel_2-Tol(MdVel_2)+\ldots+MdVel_n-Tol(MdVel_n))/N$	$(MdVel_1+Tol(MdVel_1)+MdVel_2+Tol(MdVel_2)+\ldots+MdVel_n+Tol(MdVel_n))/N$
Resistivity Index	(PS-ED)/PS	(PS-Tol(PS)-ED-Tol(ED))/(PS+Tol(PS))	(PS+Tol(PS)-ED+Tol(ED))/(PS-Tol(PS))
Pulsatility Index	(PS-ED)/TAV	(PS-Tol(PS)-ED-Tol(ED))/TAV+Tol(TAV)	(PS+Tol(PS)-ED+Tol(ED))/(TAV-Tol(TAV))
Slope (Acceleration)	(V1-V2)/T	(V1-Tol(V1)-V2-Tol(V2))/(T+Tol(T))	(V1+Tol(V1)-V2+Tol(V2))/(T-Tol(T))
Systolic/Diastolic Ratio	S/D	(PS-Tol(PS))/(ED+Tol(ED))	(PS+Tol(PS))/(ED-Tol(ED))

M-Mode Measurements

M-Mode Measurements	Range for Formula	Minimum Value	Maximum Value
Distance	0 - 24 cm	D-Tol(D)	D+Tol(D)
Time @ Slow Sweep	0 - 11.2 sec	T-Tol(T) @ Slow Sweep	T+Tol(T) @ Slow Sweep
Time @ Med Sweep	0 - 5.6 sec	T-Tol(T) @ Med Sweep	T+Tol(T) @ Med Sweep
Time @ Fast Sweep	0 - 2.8 sec	T-Tol(T) @ Fast Sweep	T+Tol(T) @ Fast Sweep
Heart Rate	60 - 240 BPM	N/Time for N beats - N/(Time for Nbeats+Tol(T)) N = 1, 2, 3, 4, or 5	N/Time for N beats - N/(Time for N beats-Tol(T)) N = 1, 2, 3, 4, or 5

Mixed Mode Measurements

Mixed-mode Measurements	Range for Formula	Minimum Value	Maximum Value
Volume Flow by Area (TAMn is in cm/s, Area is in cm^2)	(TAMn)(Area)(0.06) * l/min	(TAMn-Tol(TAMn))(Area-Tol(A))(0.06)	(TAMn+Tol(TAMn))(Area+Tol(A))(0.06)
Volume Flow by Diameter (TAMn is in cm/s, Area is in cm^2)	(TAMn)($\pi D^2/4$)(0.06) * l/min Where TAMn is in cm/s and the area is in cm^2	(TAMn-Tol(TAMn))(π * $(D-Tol(D))^2/4$)(0.06) Where TAMn is in cm/s and the area is in cm^2	(TAMn+Tol(TAMn))(π * $(D+Tol(D))^2/4$)(0.06) Where TAMn is in cm/s and the area is in cm^2

Image Display

TV Standards	EIA/NTSC and CCIR/PAL
Monitor	Color 15 inch (38 cm)
Gray Scale	256 levels
Color	256 shades
Image polarity	Positive (black on white) or negative (white on black)
Date/Time display	System displays current date and time above the imaging area. Daylight saving time changes available in system presets menu.
Image field size (by frequency)	2.5 MHz = 6 to 24 cm 5 MHz = 2 to 24 cm 7.5 MHz = 2 to 14 cm 10 MHz = 1 to 10 cm 12 MHz = 1 to 6 cm Minimum and maximum depth values for each frequency are transducer dependent.
Image Orientation	Left-to-right or right-to-left orientation 2D, Dual, Seamless Dual, and 2D image in mixed 2D/M-mode and 2D/Doppler. Transducer orientation icon indicates direction of the scan. Up/down invert for 2D, Dual, Seamless Dual, and 2D image in mixed 2D/M-mode and 2D/Doppler. Transducer orientation icon indicates direction of the scan.
Image Formats	Linear, sector, trapezoidal, and steered linear
Image Position	Image can be offset vertically and horizontally.
Other Imaging Parameters	Transmit power displayed as percentage (%). Independent Receiver Gain for 2D, THI, M, Doppler, Color, and Power. Depth Gain Compensation (DGC) - Eight DGC slider controls for DGC Gain Pre-processing - Edge Enhancement in four steps, from 0 (none) to 3; Image Persistence in five steps, from 0 (all lines new) to 4, Dynamic Range. Post-processing - Nine gray scale maps; twelve 2D tint maps, Dynamic Range, Zoom and Pan. Focusing - up to eight transmit focal zones for all electronic array transducers; number and position of focal zones are user-selectable.

Image Screen Display

Arranged by **Image**, **Calcs**, **Review**, and **Compose** task cards.

Additional screens to support filming (printing), reports, patient browser, system presets, online help, and the patient registration form.

Recordable image area of 800 by 600 pixels.

Centimeter (cm) scale marker with depth of display, focal zones: number and position, gray bar, color bar, transducer orientation indicator, error and help messages.Parameter menu indicating the priority mode. The menu lists values, settings, and controls for the imaging parameters of the priority mode: Transmit Power, Gain, and Maps (all modes).

- 2D-mode: Dynamic Range, Resolution/Speed, Edge Enhancement, Persistence, Tint
- Color: PRF, Flow, Invert, Tissue Reject, Wall Filter, Resolution/Speed, Baseline, Persistence, Smoothing, Display Color
- Power: PRF, Flow, Background, Tissue Reject, Wall Filter, Reslution/Speed, Persistence, Smoothing, and Display Power
- Doppler: PRF, Baseline, Invert, Coarse Angle Correction, Wall Filter, Gate Size, Sweep, Steer Reverse, Dynamic Range, Tint and Time/Frequency Resolution
- Parameter menu selections for the following options: SieClear, TEQ, and CCAI

Active transducer and transmit frequency, exam type, active measurement method, Measurement Label menu, Measured Results.

Controls in "group boxes" for imaging formats and mixed-mode updates styles, SieScape (option), 3-Scape (option), on-screen Biopsy guidelines, VCR recording (option), and Physio settings (option).

Trackball status icons and print/store icons.

Patient Registration Form

Fields for names of the patient, patient identification, patient information (date of birth, age, sex, height, weight, blood pressure), institution, performing and referring physician, and operator's initials.

Text Annotation

System-defined and user-defined text for each application. User can directly enter text on the image screen using the keyboard. Auto-complete text provides matching phrases to entered character(s); Text A, B, C or D keys insert pre-defined text on the screen.

Pictograms

Standard and exam-specific graphics representing anatomical structures are user selectable. Transducer position and orientation are also available for positioning on the pictograms.

System Requirements

This section describes the power and environmental requirements for the SONOLINE Antares ultrasound imaging system.

Power Supply Requirements

MAINS V	Range	Max. Current	Frequency	Freq. Range
230V~	196V to 264V	6.5 amps	50/60 Hz	47 to 63 Hz
115V~	98V to 132V	12 amps	50/60 Hz	47 to 63 Hz
100V~	90V-110V	15 amps	50/60 Hz	47 to 63 Hz

Possible Combinations with Other Equipment

Only the peripheral devices listed in the *System Reference* are approved for use with the SONOLINE Antares ultrasound system. Any use of other devices with the system will be at the user's risk and may void the system warranty.

On-board peripheral devices may need to be installed by an authorized Siemens representative or approved third party. Check with your sales representative.

System Reference

RESOURCES:
Listing of Accessories and Options — Ch 2

⚠ **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (e.g., EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to the signal input or signal output port configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the Accessories and Options chapter. If in doubt, consult Siemens service department or your local Siemens representative.

Leakage Currents

Connecting peripheral products and accessories from non-isolated sources may result in chassis leakage current exceeding safe levels.

Audio, Video, and Data Transmission Connections ▪ Input and Output Signals

Input/Output	Connector
Modem, J1	USB-A
Ethernet RJ45	10BaseT/100BaseT
Composite Video	BNC-type (1 input, 1 output)
Y/C Video	S-terminal (1 input, 1 output)
2 Channel Audio (Right, Left)	RCA-type (1 input, 1 output)

Output	Connector
RGB/S	VISTA 15-pin high density D-sub miniature
RS-232 port for printer/ PC communication (COM1)	9-pin D-sub miniature
Remote printer connector, J5B, J5A	USB-A
Parallel Port (Printer)	25-pin D-sub miniature
Composite Video	BNC-type

Input	Connector
ECG Trigger	BNC-out

Video Standard

Factory setting for 230V is PAL (625 lines), for 115V is NTSC (525 lines) and for 100V is NTSC (525 lines).

Environmental Requirements

EMC Note: Operating the SONOLINE Antares ultrasound imaging system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

	During Operation	**Ambient (During Storage or Transporation)**
Relative humidity:	10% to 80%, non-condensing	10% to 95%, non-condensing
Temperature:		
System	+10°C to +40°C*	-20°C to +60°C
Array Transducers	+10°C to +40°C	-40°C to +60°C
Maximum Altitude:	Operation up to 3,050 meters (10,000 feet)	5,050 meters (18,000 feet)

**For systems with documentation devices installed.*

Protective Measures

Explosion protection: This product is not designed for operation in areas subject to explosion hazards.

Maximum Physical Dimensions

Width: 610 mm

Height: 1308 mm

Depth: 915 mm

Weight: 190 kg* (410 lbs) unpacked and ready for operation

160 kg** (350 lbs) unpacked and ready for operation

**For systems with documentation devices installed.*
***For systems without documentation devices installed.*

System Classifications

The SONOLINE Antares ultrasound imaging system has the following classifications:

- Type of protection against electrical shock:

  Class I

- Degree of protection against electrical shock:

  Type B equipment
  Type BF for ECG connection

- Degree of protection against harmful ingress of water:

  Ordinary equipment

- Degree of safety of application in the presence of a flammable anesthetic material with air or with oxygen or nitrous oxide:

  Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

- Mode of operation:

  Continuous operation

Standards Compliance

The SONOLINE Antares system is in compliance with the following standards, including all applicable amendments at the time of product release.

Quality Standards

- FDA QSR 21 CFR Part 820
- ISO 9001:94
- ISO 13485
- EN 46001:96

Design Standards

- UL 2601-1
- CSA C22.2 No. 601.1
- EN 60601-1 and IEC 60601-1
- EN 60601-1-1 and IEC 60601-1-1
- EN 60601-1-2 and IEC 60601-1-2
- EN 60601-2-37 and IEC 60601-2-37

Acoustic Output Standards

- IEC 61157 (Declaration of Acoustic Power)
- AIUM/NEMA UD-2, 1998 Acoustic Output Measurement Standard for Diagnostic Ultrasound
- AIUM/NEMA, 1998 Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment

CE Declaration

This product is provided with a CE marking in accordance with the regulations stated in Council Directive 93/42/EEC of June 14, 1993 concerning Medical Devices. Siemens Medical Solutions USA, Inc., is certified by notified body 0123 to Annex II.3 – Full Quality System.

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